CloudByte User Guide

ElastiStor Appliance ESA - A10

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Preface

About This Manual

This manual is written for professional system integrators and PC technicians. It provides information for the installation and use of the CloudByte ElastiStor Appliance-A10 (ESA-A10). Installation and maintenance should be performed by experienced technicians only.

The ESA-A10 is a high-end storage system based on a 2U rackmountable chassis and a dual processor serverboard.

Manual Organization

Chapter 1: Introduction

The first chapter provides a checklist of the main components included with the system and describes the main features of the serverboard and the chassis.

Chapter 2: Server Installation

This chapter describes the steps necessary to install the ESA-A10 into a rack and check out the server configuration prior to powering up the system. If your server was ordered without processor and memory components, this chapter will refer you to the appropriate sections of the manual for their installation.

Chapter 3: System Interface

Refer here for details on the system interface, which includes the functions and information provided by the control panel on the chassis as well as other LEDs located throughout the system.

Chapter 4: Standardized Warning Statements

You should thoroughly familiarize yourself with this chapter for a general overview of safety precautions that should be followed when installing and servicing the ESA-A10.

Chapter 5: Advanced Serverboard Setup

Chapter 5 provides detailed information on the serverboard, including the locations and functions of connections, headers and jumpers. Refer to this chapter when adding or removing processors or main memory and when reconfiguring the serverboard.

Chapter 6: BIOS

The BIOS chapter includes an introduction to BIOS and provides detailed information on running the CMOS Setup Utility.

Appendix A: BIOS Error Beep Codes

Appendix B: System Specifications

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Appendix A BIOS Error Beep Codes

Appendix B System Specifications

Appendix A

BIOS Error Beep Codes

During the POST (Power-On Self-Test) routines, which are performed at each system boot, errors may occur.

Non-fatal errors are those which, in most cases, allow the system to continue to boot. The error messages normally appear on the screen.

Fatal errors will not allow the system to continue with bootup procedure. If a fatal error occurs, you should consult with your system manufacturer for possible repairs.

These fatal errors are usually communicated through a series of audible beeps. The numbers on the fatal error list correspond to the number of beeps for the corresponding error.

BIOS Error Beep Codes		
Beep Code/LED	**Error Message**	**Description**
1 beep	Refresh	Ready to boot
5 short beeps + 1 long beep	Memory error	No memory detected in the system
5 beeps	No Con-In or No Con-Out devices	Con-In: USB or PS/2 keyboard, PCI or Serial Console Redirection, IPMI KVM or SOL Con-Out: Video Controller, PCI or Serial Console Redirection, IPMI SOL
X9 IPMI Error Codes		
1 Continuous Beep	System OH	System Overheat

Notes

Appendix B

System Specifications

Processors

Dual Intel® Xeon® E5-2600 Series processors in LGA 2011 sockets

Note: Please refer to our web site for a complete listing of supported processors.

Chipset

Intel C602J

Memory Capacity

Sixteen DIMM sockets that can support up to 512 GB of registered (RDIMM), 1 TB of Load Reduced (LRDIMM) or 128 GB of ECC or Unbuffered (UDIMM) ECC/non-ECC 1866/1600/1333/1066/800 DDR3 memory

Note: See the memory section in Chapter 5 for details.

SATA Controller

Intel on-chip controller for six SATA ports, RAID 0, 1 5 and 10 supported

SATA Drive Bays

Four hot-swap drive bays to house four SATA hard drives

Expansion Slots

Riser card for SAS expander add-on card

Serverboard

X9DRD-EF

Dimensions: 12 x 13 in (305 x 330 mm)

Chassis

SC826BE1C-R920LPB (2U rackmount)

Dimensions: (WxHxD) 17.2 x 3.5 x 25.5 in. (437 x 89 x 648 mm)

Weight

Gross Weight: 52 lbs. (23.6 kg.)

System Cooling

Three 8-cm system cooling fans

System Input Requirements

AC Input Voltage: 100 - 240V AC auto-range

Rated Input Current: 10.7 - 4.2A max

Power Supply

Rated Output Power: 920W (Part# PWS-920P-1R)

Rated Output Voltages: +12V (75A), +5Vsb (4A)

Operating Environment

Operating Temperature: 10º to 35º C (50º to 95º F)

Non-operating Temperature: -40º to 60º C (-40º to 140º F)

Operating Relative Humidity: 8% to 90% (non-condensing)

Non-operating Relative Humidity: 5% to 95% (non-condensing)

Regulatory Compliance

Electromagnetic Emissions:
FCC Class A, EN 55022 Class A, EN 61000-3-2/-3-3, CISPR 22 Class A

Electromagnetic Immunity:
EN 55024/CISPR 24, (EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-8, EN 61000-4-11)

Safety:
EN 60950/IEC 60950-Compliant, UL Listed (USA), CUL Listed (Canada), TUV Certified (Germany), CE Marking (Europe)

Disclaimer (continued from front)

The products sold by CloudByte are not intended for and will not be used in life support systems, medical equipment, nuclear facilities or systems, aircraft, aircraft devices, aircraft/emergency communication devices or other critical systems whose failure to perform be reasonably expected to result in significant injury or loss of life or catastrophic property damage. Accordingly, CloudByte disclaims any and all liability, and should buyer use or sell such products for use in such ultra-hazardous applications, it does so entirely at its own risk. Furthermore, buyer agrees to fully indemnify, defend and hold CloudByte harmless for and against any and all claims, demands, actions, litigation, and proceedings of any kind arising out of or related to such ultra-hazardous use or sale.

Notes

Chapter 1

Introduction

1-1 Overview

The ESA-A10 is a high-end storage system comprised of two main subsystems: a 2U/rack mount chassis and a dual processor serverboard. Please refer to our web site for information on operating systems that have been certified for use with the system (www.cloudbyte.com).

In addition to the serverboard and chassis, various hardware components have been included with theESA-A10, as listed below:

- Two passive CPU heatsinks
- Three 8-cm system fans
- One air shroud
- SATA Accessories
  One SATA backplane
  Twelve drive carriers
- Add-on card for SAS3 connections
- One rackmount kit
  Note: For your system to work properly, please follow the links below to download all necessary drivers/utilities and the user's manual for your server.
- CloudByte product manuals: http://www.docs.cloudbyte.com
- If you have any questions, please contact our support team at: support@cloudbyte.com

1-2 Serverboard Features

The 6047R-E1R36L is built around the X9DRD-EF, a dual processor serverboard based on Intel's C602J chipset. Below are the main features of the X9DRD-EF (see Figure 1-1 for a block diagram of the chipset).

Processors

The X9DRD-EF supports single or dual Intel® Xeon® E5-2600 Series processors in LGA 2011 sockets. Please refer to the serverboard description pages on our web site for a complete listing of supported processors.

Memory

The X9DRD-EF has 16 DIMM sockets that can support up to 512 GB of registered (RDIMM), 1 TB of Load Reduced (LRDIMM) or 128 GB of ECC or Unbuffered (UDIMM) ECC/non-ECC 1866/1600/1333/1066/800 DDR3 memory. Please refer to Chapter 5 for installing memory.

SATA

An on-chip SATA controller is integrated into the X9DRD-EF to provide a six-port, Serial ATA subsystem, which is RAID 0, 1, 5 and 10 supported. Two of the ports support SATA 3.0, while the other four are SATA 2.0 ports. The SATA drives are hot-swappable units.

I/O Ports

The color-coded I/O ports include one COM port, a VGA (monitor) port, four USB 2.0 ports and two gigabit Ethernet ports. A dedicated IPMI LAN port is also included.

PCI Expansion Slots

The X9DRD-EF features six PCI-E 3.0 x8 expansion slots. One of these slots may be populated with an add-on card with the use of the RSC-RR1U-E8 riser card (included with the system).

Onboard Graphics

The X9DRD-EF provides onboard grpahics with a Matrox G200eW graphics controller.

1-3 Server Chassis Features

The SC826BE1C-R920LPB is an 2U form factor chassis designed to be used in a storage configuration. The following is a general outline of the main features of the SC826BE1C-R920LPB chassis.

System Power

The SC826BE1C-R920LPB features a redundant 920W power supply composed of two separate power modules. This power redundancy feature allows you to replace a failed power supply without shutting down the system.

Hard Drive Subsystem

The SC826BE1C-R920LPB chassis was designed to support 12 hot-swap SATA hard drives. Two 2.5" rear-mounted, hot-swap drive bays are available as an option for use with the onboard SATA controller (MCP-220-82609-0N). These drives install between the power supplies and the I/O panel (see Figure 6-1).

Front Control Panel

The control panel on the SC826BE1C-R920LPB provides you with system monitoring and control. LEDs indicate system power, HDD activity, network activity, system overheat and power supply failure. A main power button and a system reset button are also included.

Cooling System

The SC826BE1C-R920LPB chassis includes three 8-cm hot-plug system cooling fans located in the middle section of the chassis. An air shroud channels the airflow from the system fans to efficiently cool the processor area of the system. Each power supply module also includes a cooling fan.

Figure 1-1. Intel C602J Chipset:
System Block Diagram

Note: This is a general block diagram. Please see Chapter 5 for details.

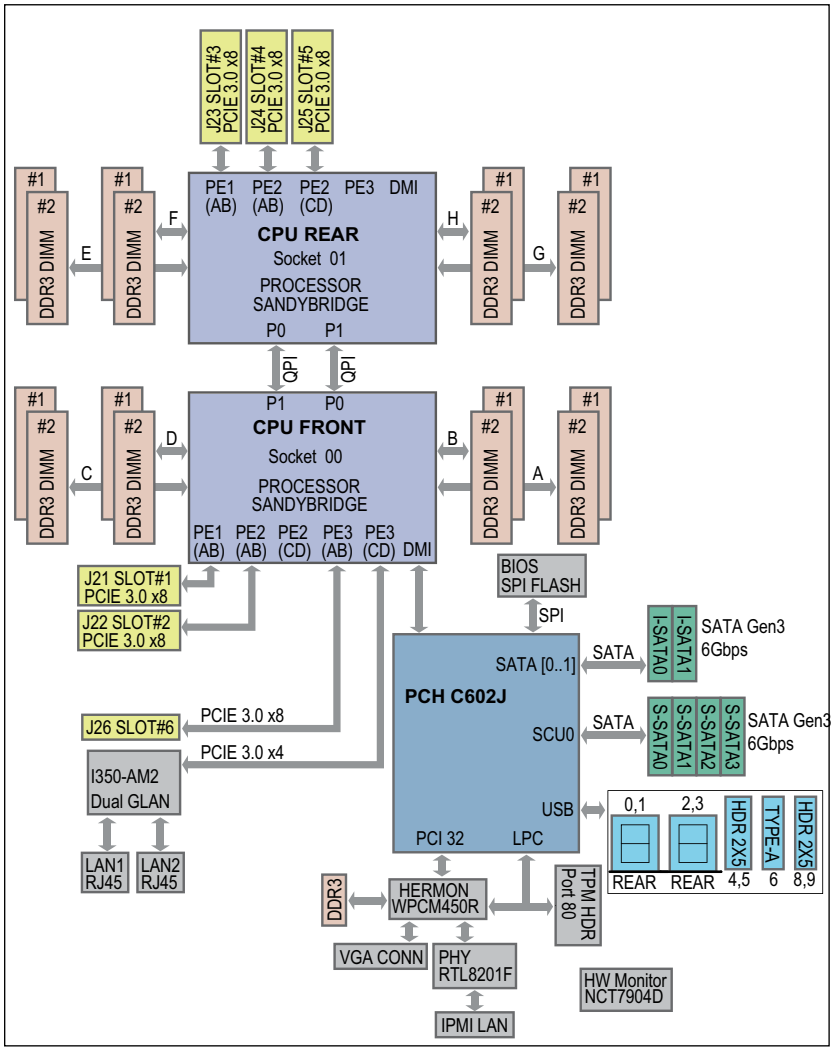
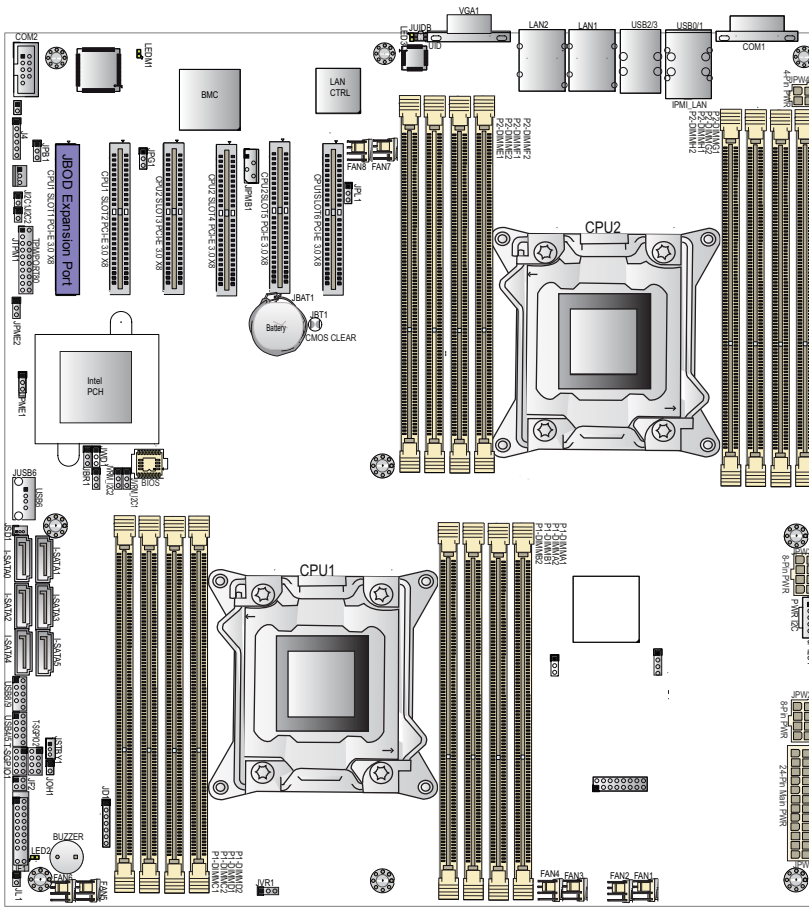


Figure 1-2. X9DRD-EF Serverboard



1-4 Contacting CloudByte

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Fax:	+1-(408)-663-6900
Email:	info@cloudbyte.com (General Information)
	support@cloudbyte.com (Technical Support)
Web Site:	www.cloudbyte.com

Chapter 2

Server Installation

2-1 Overview

This chapter provides a quick setup checklist to get your ESA-A10 up and running. Following these steps in the order given should enable you to have the system operational within a minimum amount of time. This quick setup assumes that your system has come to you with the processors and memory preinstalled. If your system is not already fully integrated with a serverboard, processors, system memory etc., please turn to the chapter or section noted in each step for details on installing specific components.

2-2 Unpacking the System

You should inspect the box the ESA-A10 was shipped in and note if it was damaged in any way. If the server itself shows damage you should file a damage claim with the carrier who delivered it.

Decide on a suitable location for the rack unit that will hold the ESA-A10. It should be situated in a clean, dust-free area that is well ventilated. Avoid areas where heat, electrical noise and electromagnetic fields are generated. You will also need it placed near a grounded power outlet. Read the Rack and Server Precautions in the next section.

2-3 Preparing for Setup

The box the ESA-A10 was shipped in should include two sets of rail assemblies, two rail mounting brackets and the mounting screws you will need to install the system into the rack. Follow the steps in the order given to complete the installation process in a minimum amount of time. Please read this section in its entirety before you begin the installation procedure outlined in the sections that follow.

Choosing a Setup Location

- Leave enough clearance in front of the rack to enable you to open the front door completely (~25 inches) and approximately 30 inches of clearance in the back of the rack to allow for sufficient airflow and ease in servicing.

- This product is for installation only in a Restricted Access Location (dedicated equipment rooms, service closets and the like).

- This product is not suitable for use with visual display work place devices acccording to §2 of the the German Ordinance for Work with Visual Display Units.

Rack Precautions

- Ensure that the leveling jacks on the bottom of the rack are fully extended to the floor with the full weight of the rack resting on them.

- In single rack installation, stabilizers should be attached to the rack. In multiple rack installations, the racks should be coupled together.

- Always make sure the rack is stable before extending a component from the rack.

- You should extend only one component at a time - extending two or more simultaneously may cause the rack to become unstable.

Server Precautions

- Review the electrical and general safety precautions in Chapter 4.

- Determine the placement of each component in the rack *before* you install the rails.

- Install the heaviest server components on the bottom of the rack first, and then work up.

- Use a regulating uninterruptible power supply (UPS) to protect the server from power surges, voltage spikes and to keep your system operating in case of a power failure.

- Allow any hot plug drives and power supply modules to cool before touching them.

- Always keep the rack's front door and all panels and components on the servers closed when not servicing to maintain proper cooling.

Rack Mounting Considerations

Ambient Operating Temperature

If installed in a closed or multi-unit rack assembly, the ambient operating temperature of the rack environment may be greater than the ambient temperature of the room. Therefore, consideration should be given to installing the equipment in an environment compatible with the manufacturer's maximum rated ambient temperature (Tmra).

Airflow

Equipment should be mounted into a rack so that the amount of airflow required for safe operation is not compromised.

Mechanical Loading

Equipment should be mounted into a rack so that a hazardous condition does not arise due to uneven mechanical loading.

Circuit Overloading

Consideration should be given to the connection of the equipment to the power supply circuitry and the effect that any possible overloading of circuits might have on overcurrent protection and power supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

Reliable Ground

A reliable ground must be maintained at all times. To ensure this, the rack itself should be grounded. Particular attention should be given to power supply connections other than the direct connections to the branch circuit (i.e. the use of power strips, etc.).

Warning! To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:

- This unit should be mounted at the bottom of the rack if it is the only unit in the rack.
- When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.
- If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.

2-4 Installing the System into a Rack

This section provides information on installing the chassis into a rack unit with the quick-release rails provided. There are a variety of rack units on the market, which may mean the assembly procedure will differ slightly. You should also refer to the installation instructions that came with the rack unit you are using.

Separating the Sections of the Rack Rails

The chassis package includes two rail assemblies in the rack mounting kit. Each assembly consists of two sections: an inner fixed chassis rail that secures directly to the server chassis and an outer fixed rack rail that secures directly to the rack itself.

Installing the Inner Rail Extension

The chassis includes a set of inner rails in two sections: inner rails and inner rail extensions. The inner rails are pre-attached to the chassis, and do not interfere with normal use of the chassis if you decide not to use a server rack. The inner rail extension is attached to the inner rail to mount the chassis in the rack.

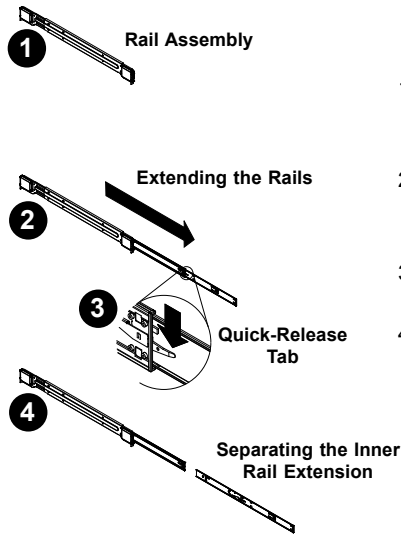
Installing the Inner Rails

1. Place the inner rail extensions on the side of the chassis aligning the hooks of the chassis with the rail extension holes. Make sure the extension faces "outward" just like the pre-attached inner rail.

2. Slide the extension toward the front of the chassis.

3. Secure the chassis with 2 screws as illustrated. Repeat steps for the other inner rail extension.

Figure 2-1: Separating the Rack Rails



Separating the Inner and Outer Rails

1. Locate the rail assembly in the chassis packaging.
2. Extend the rail assembly by pulling it outward.
3. Press the quick-release tab.
4. Separate the inner rail extension from the outer rail assembly.

Warning: do not pick up the server with the front handles. They are designed to pull the system from a rack only.

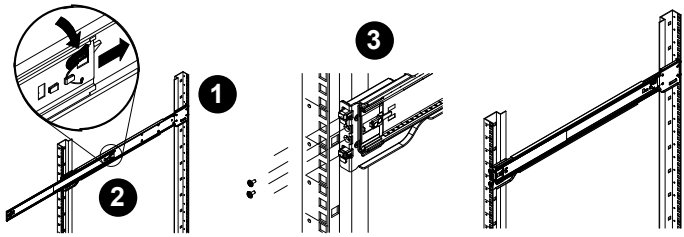


Figure 2-2. Assembling the Outer Rails

Outer Rack Rails

Outer rails attach to the rack and hold the chassis in place. The outer rails for the chassis extend between 30 inches and 33 inches.

Installing the Outer Rails to the Rack

1. Secure the back end of the outer rail to the rack, using the screws provided.
2. Press the button where the two outer rails are joined to retract the smaller outer rail.
3. Hang the hooks of the rails onto the rack holes and if desired, use screws to secure the front of the outer rail onto the rack.
4. Repeat steps 1-3 for the remaining outer rail.

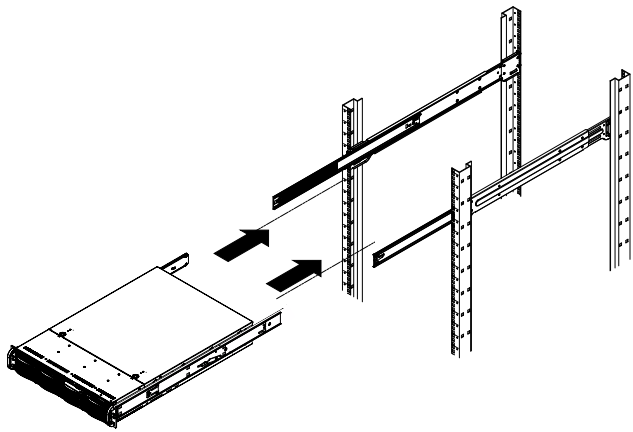


Figure 2-3. Installing the Rack Rails

Installing the Chassis into a Rack

Note: do not pick up the server with the front handles. They are designed to pull the system from a rack only.

1. Extend the outer rails as illustrated above.
2. Align the inner rails of the chassis with the outer rails on the rack.
3. Slide the inner rails into the outer rails, keeping the pressure even on both sides. When the chassis has been pushed completely into the rack, it should click into the locked position.
4. Optional screws may be used to secure the to hold the front of the chassis to the rack.

Stability hazard. The rack stabilizing mechanism must be in place, or the rack must be bolted to the floor before you slide the unit out for servicing. Failure to stabilize the rack can cause the rack to tip over.

Notes

Chapter 3

System Interface

3-1 Overview

There are several LEDs on the control panel as well as others on the drive carriers to keep you constantly informed of the overall status of the system as well as the activity and health of specific components. There are also two buttons on the chassis control panel.

3-2 Control Panel Buttons

There are two buttons located on the front of the chassis: a reset button and a power on/off button.

RESET

Reset

Use the reset button to reboot the system.

Power

This is the main power button, which is used to apply or turn off the main system power. Turning off system power with this button removes the main power but keeps standby power supplied to the system.

3-3 Control Panel LEDs

The control panel located on the front of the chassis has several LEDs. These LEDs provide you with critical information related to different parts of the system. This section explains what each LED indicates when illuminated and any corrective action you may need to take.

Power Fail

Indicates a power supply module has failed. The second power supply module will take the load and keep the system running but the failed module will need to be replaced. Refer to Chapter 6 for details on replacing the power supply. This LED should be off when the system is operating normally.

Overheat/Fan Fail:

When this LED flashes, it indicates a fan failure. When on continuously it indicates an overheat condition, which may be caused by cables obstructing the airflow in the system or the ambient room temperature being too warm. Check the routing of the cables and make sure all fans are present and operating normally. You should also check to make sure that the chassis covers are installed. Finally, verify that the heatsinks are installed properly (see Chapter 5). This LED will remain flashing or on as long as the indicated condition exists.

NIC1

Indicates network activity on the LAN1 port when flashing.

NIC2

Indicates network activity on the LAN2 port when flashing.

HDD

On the ESA-A10, this LED indicates hard drive activity when flashing.

Power

Indicates power is being supplied to the system's power supply units. This LED should normally be illuminated when the system is operating.

3-4 Drive Carrier LEDs

Each drive carrier has two LEDs:

- **Green:** When illuminated, the green LED on the SATA drive carrier indicates drive activity. A connection to the SATA backplane enables this LED to blink on and off when that particular drive is being accessed. Please refer to Chapter 6 for instructions on replacing failed SATA drives.

- **Red:** When this LED flashes it indicates the drive is rebuilding. When solid on it indicates a SATA drive failure. If a drive fails, you should be notified by your system management software. Please refer to Chapter 6 for instructions on replacing failed drives.

Notes

Chapter 4

Standardized Warning Statements for AC Systems

4-1 About Standardized Warning Statements

The following statements are industry standard warnings, provided to warn the user of situations which have the potential for bodily injury. Should you have questions or experience difficulty, contact CloudByte's Technical Support department for assistance. Only certified technicians should attempt to install or configure components.

Read this appendix in its entirety before installing or configuring components in the CloudByte chassis.

Warning Definition

Warning!

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents.

Installation Instructions

Warning!

Read the installation instructions before connecting the system to the power source.

Circuit Breaker

Warning!

This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than: 250 V, 20 A.

Power Disconnection Warning

Warning!

The system must be disconnected from all sources of power and the power cord removed from the power supply module(s) before accessing the chassis interior to install or remove system components.

Equipment Installation

Warning!

Only trained and qualified personnel should be allowed to install, replace, or service this equipment.

Restricted Area

Warning!

This unit is intended for installation in restricted access areas. A restricted access area can be accessed only through the use of a special tool, lock and key, or other means of security. (This warning does not apply to workstations).

Battery Handling

Warning!

There is the danger of explosion if the battery is replaced incorrectly. Replace the battery only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions

Redundant Power Supplies

Warning!

This unit might have more than one power supply connection. All connections must be removed to de-energize the unit.

Backplane Voltage

Warning!

Hazardous voltage or energy is present on the backplane when the system is operating. Use caution when servicing.

Comply with Local and National Electrical Codes

Warning!

Installation of the equipment must comply with local and national electrical codes.

Product Disposal

Warning!

Ultimate disposal of this product should be handled according to all national laws and regulations.

Hot Swap Fan Warning

Warning!

The fans might still be turning when you remove the fan assembly from the chassis. Keep fingers, screwdrivers, and other objects away from the openings in the fan assembly's housing.

Power Cable and AC Adapter

Warning!

When installing the product, use the provided or designated connection cables, power cables and AC adaptors. Using any other cables and adaptors could cause a malfunction or a fire. Electrical Appliance and Material Safety Law prohibits the use of UL or CSA -certified cables (that have UL/CSA shown on the code) for any other electrical devices than products designated by CloudByte only.

Notes

Chapter 5

Advanced Serverboard Setup

This chapter covers the steps required to install processors and heatsinks to the serverboard, connect the data and power cables and install add-on cards. All serverboard jumpers and connections are described and a layout and quick reference chart are included in this chapter. Remember to close the chassis completely when you have finished working on the serverboard to protect and cool the system sufficiently.

5-1 Handling the Serverboard

Static electrical discharge can damage electronic components. To prevent damage to printed circuit boards, it is important to handle them very carefully (see Chapter 4). Also note that the size and weight of the serverboard can cause it to bend if handled improperly, which may result in damage. To prevent the serverboard from bending, keep one hand under the center of the board to support it when handling.

The following measures are generally sufficient to protect your equipment from static discharge.

Precautions

- Use a grounded wrist strap designed to prevent static discharge.
- Touch a grounded metal object before removing any board from its antistatic bag.
- Handle a board by its edges only; do not touch its components, peripheral chips, memory modules or gold contacts.
- When handling chips or modules, avoid touching their pins.
- Put the serverboard, add-on cards and peripherals back into their antistatic bags when not in use.

Unpacking

The serverboard is shipped in antistatic packaging to avoid static damage. When unpacking the board, make sure the person handling it is static protected.

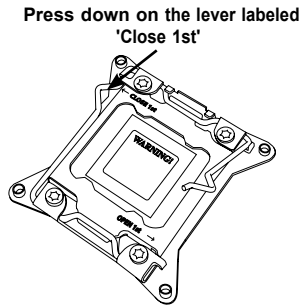
5-2 Processor and Heatsink Installation

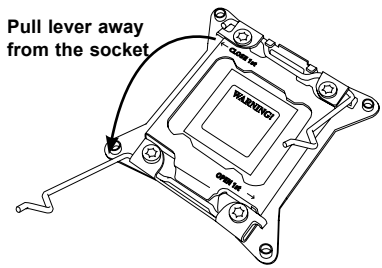
Notes:

- Always connect the power cord last and always remove it before adding, removing or changing any hardware components. Make sure that you install the processor into the CPU socket before you install the CPU heatsink.
- If you buy a CPU separately, make sure that you use an Intel-certified multi-directional heatsink only.
- Make sure to install the serverboard into the chassis before you install the CPU heatsinks.
- When receiving a serverboard without a processor pre-installed, make sure that the plastic CPU socket cap is in place and none of the socket pins are bent; otherwise, contact your retailer immediately.
- Refer to the CloudByte web site for updates on CPU support.

Installing an LGA 2011 Processor

1. There are two levers on the LGA 2011 socket. First press and release the load lever labeled 'Open 1st'.
2. Press the second load lever labeled 'Close 1st' to release the load plate from its locked position.



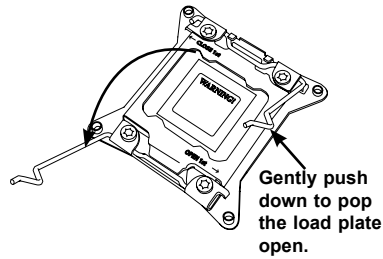


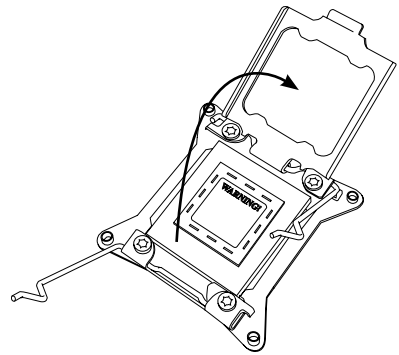
3. With the lever labeled 'Close 1st' fully retracted, gently push down on the 'Open 1st' lever to open the load plate. Lift the load plate to open it completely.

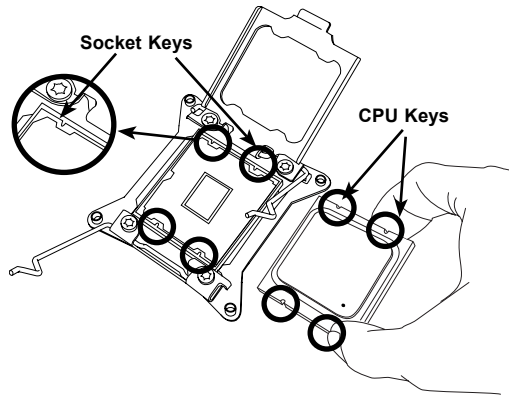
4. Using your thumb and the index finger, remove the 'WARNING' plastic cap from the socket.

5. Use your thumb and index finger to hold the CPU by its edges. Align the CPU keys, which are semi-circle cutouts, against the socket keys.

6. Once they are aligned, carefully lower the CPU straight down into the socket. (Do not drop the CPU on the socket. Do not move the CPU horizontally or vertically and do not rub the CPU against any pins of the socket, which may damage the CPU or the socket.)



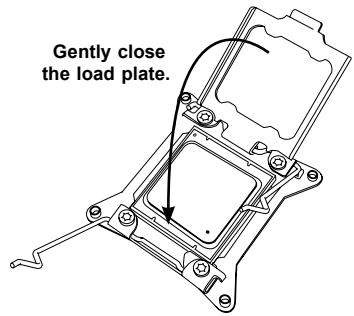


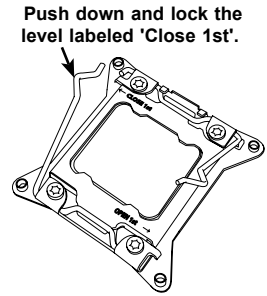


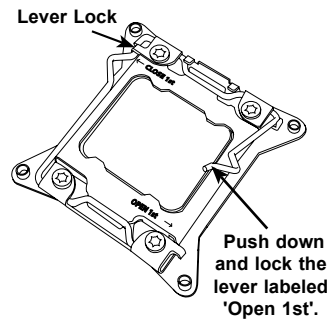
Warning: You can only install the CPU to the socket in one direction. Make sure that the CPU is properly inserted into the socket before closing the load plate. If it doesn't close properly, do not force it as it may damage your CPU. Instead, open the load plate again and double-check that the CPU is aligned properly.

7. With the CPU in the socket, inspect the four corners of the CPU to make sure that they are flush with the socket.

8. Close the load plate. Lock the lever labeled 'Close 1st', then lock the lever labeled 'Open 1st'. Use your thumb to gently push the load levers down until the lever locks.







Installing a Passive CPU Heatsink

1. Do not apply any thermal grease to the heatsink or the CPU die -- the required amount has already been applied.

2. Place the heatsink on top of the CPU so that the four mounting holes are aligned with those on the serverboard and the heatsink bracket underneath.

3. Screw in two diagonal screws (i.e., the #1 and the #2 screws) until just snug (do not over-tighten the screws to avoid possible damage to the CPU.)

4. Add the two remaining screws then fully tighten all four screws.

Removing the Heatsink

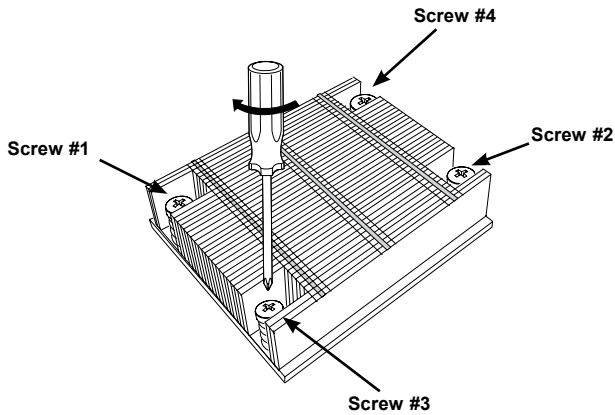
Warning: We do not recommend removing the CPU or the heatsink. However, if you do need to remove the heatsink, please follow the instructions below to prevent damage to the CPU or other components.

1. Unscrew the heatsink screws from the serverboard in the sequence as shown described above.

2. Gently wriggle the heatsink to loosen it from the CPU (do not use excessive force). Once the CPU is loose, remove the it from the CPU socket.

3. Clean the surface of the CPU and the heatsink, removing the used thermal grease. Reapply the proper amount of thermal grease on the surface before re-installing the CPU and the heatsink.

Figure 5-1. Installing the Heatsink



5-3 Connecting Cables

Now that the processors are installed, the next step is to connect the cables to the serverboard. These include the data (ribbon) cables for the peripherals and control panel and the power cables.

Connecting Data Cables

The cables used to transfer data from the peripheral devices have been carefully routed in preconfigured systems to prevent them from blocking the flow of cooling air that moves through the system from front to back. If you need to disconnect any of these cables, you should take care to reroute them as they were originally after reconnecting them (make sure the red wires connect to the pin 1 locations). If you are configuring the system, keep the airflow in mind when routing the cables.

The following data cables (with their serverboard connector locations noted) should be connected.

See the serverboard layout diagram in this chapter for connector locations.

- Control Panel cable (JF1, see next page)
- USB cable for front side access (USB4/5)

Connecting Power Cables

The Server board has a 24-pin primary power supply connector designated "JPW1" for connection to the ATX power supply. Connect the appropriate connector from the power supply to JPW1 to supply power to the serverboard. See the Connector Definitions section in this chapter for power connector pin definitions.

In addition, your power supply must be connected to the 8-pin Processor Power connectors at JPW2 and JPW3.

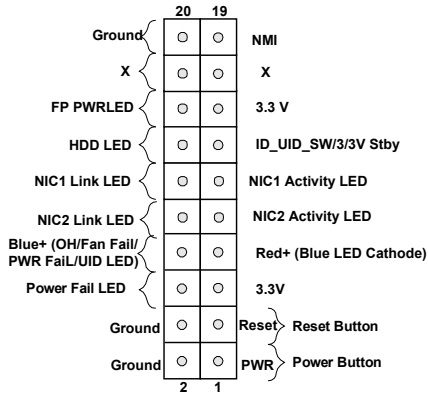
Connecting the Control Panel

JF1 contains header pins for various front control panel connectors. See Figure 5-2 for the pin locations of the various front control panel buttons and LED indicators. Please note that even and odd numbered pins are on opposite sides of each header.

All JF1 wires have been bundled into single keyed ribbon cable to simplify their connection. Connect one end of this cable to JF1 and the other end to the Control Panel printed circuit board, located just behind the system status LEDs in the chassis.

See the Connector Definitions section in this chapter for details and pin descriptions of JF1.

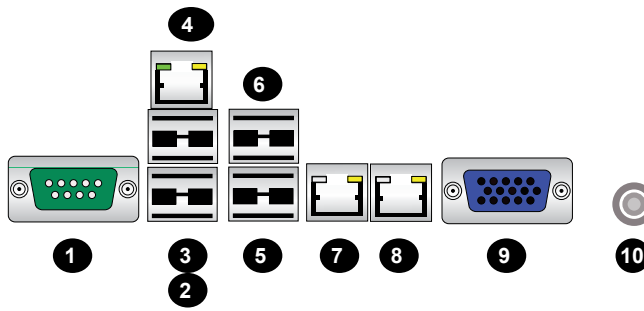
Figure 5-2. Front Control Panel Header Pins (JF1)



5-4 I/O Ports

The I/O ports are color coded in conformance with the PC 99 specification. See Figure 5-3 below for the colors and locations of the various I/O ports.

Figure 5-3. Rear Panel I/O Ports



Backplane I/O Ports	
1. COM1 Port	6. USB Port 3
2. USB Port 0	7. LAN Port 1
3. USB Port 1	8. LAN Port 2
4. Dedicated IPMI LAN	9. VGA Port
5. USB Port 2	10. UID Switch

5-5 Installing Memory

Note: Check the CloudByte web site for recommended memory modules.

CAUTION

Exercise extreme care when installing or removing DIMM modules to prevent any possible damage.

Installing DIMMs

1. Insert the desired number of DIMMs into the memory slots, starting with slots DIMM1A. Pay attention to the notch along the bottom of the module to prevent inserting the DIMM module incorrectly. See Figure 5-4.

2. Gently press down on the DIMM module until it snaps into place in the slot. Repeat fstep 1 to install to DIMM1B if needed.

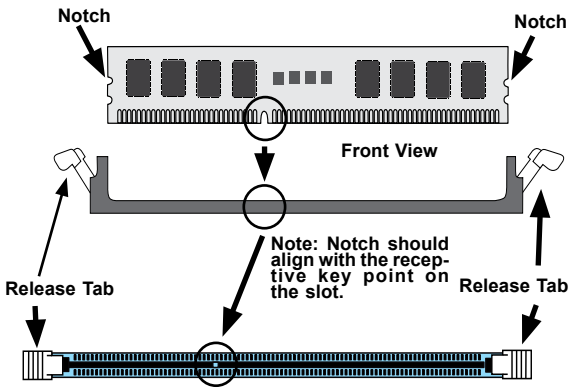
Memory Support

The X9DRD-EF has 16 DIMM sockets that can support up to 512 GB of registered (RDIMM), 1 TB of Load Reduced (LRDIMM) or 128 GB of ECC or Unbuffered (UDIMM) ECC/non-ECC 1866/1600/1333/1066/800 DDR3 memory. Please refer to Chapter 5 for installing memory.

Figure 5-4. Installing DIMM into Slot

To Install: Insert module vertically and press down until it snaps into place. Pay attention to the alignment notch at the bottom.

To Remove:
Use your thumbs to gently push the release tabs near both ends of the module. This should release it from the slot.



Processor & Memory Module Population Configuration

For memory to work properly, follow the tables below for memory installation.

Processors and their Corresponding Memory Modules								
CPU#	**Corresponding DIMM Modules**							
CPU 1	P1-DIMMA1	P1-DIMMB1	P1-DIMMC1	P1-DIMMD1	P1-DIMMA2	P1-DIMMB2	P1-DIMMC2	P1-DIMMD2
CPU2	P2-DIMME1	P2-DIMMF1	P2-DIMMG1	P2-DIMMH1	P2-DIMME2	P2-DIMM F2	P2-DIMMG2	P2-DIMMH2

Processor and Memory Module Population for Optimal Performance	
Number of CPUs+DIMMs	**CPU and Memory Population Configuration Table (For memory to work properly, please follow the instructions below.)**
1 CPU & 2 DIMMs	CPU1 P1-DIMMA1/P1-DIMMB1
1 CPU & 4 DIMMs	CPU1 P1-DIMMA1/P1-DIMMB1, P1-DIMMC1/P1-DIMMD1
1 CPU & 5~8 DIMMs	CPU1 P1-DIMMA1/P1-DIMMB1, P1-DIMMC1/P1-DIMMD1 + Any memory pairs in P1-DIMMA2/P1-DIMMB2/P1-DIMMC2/P1-DIMMD2 slots
2 CPUs & 4 DIMMs	CPU1 + CPU2 P1-DIMMA1/P1-DIMMB1, P2-DIMME1/P2-DIMMF1
2 CPUs & 6 DIMMs	CPU1 + CPU2 P1-DIMMA1/P1-DIMMB1/P1-DIMMC1/P1-DIMMD1, P2-DIMME1/P2-DIMMF1
2 CPUs & 8 DIMMs	CPU1 + CPU2 P1-DIMMA1/P1-DIMMB1/P1-DIMMC1/P1-DIMMD1, P2-DIMME1/P2-DIMMF1/P2-DIMMG1/P2-DIMMH1
2 CPUs & 10~16 DIMMs	CPU1/CPU2 P1-DIMMA1/P1-DIMMB1/P1-DIMMC1/P1-DIMMD1, P2-DIMME1/P2-DIMMF1/P2-DIMMG1/P2-DIMMH1 + Any memory pairs in P1, P2 DIMM slots
2 CPUs & 16 DIMMs	CPU1/CPU2 P1-DIMMA1/P1-DIMMB1/P1-DIMMC1/P1-DIMMD1, P2-DIMME1/P2-DIMMF1/P2-DIMMG1/P2-DIMMH1,P1-DIMMA2/P1-DIMMB2/P1-DIMMC2/P1-DIMMD2, P2-DIMME2/P2-DIMMF2/P2-DIMMG2/P2-DIMMH2

Intel E5-2600 Series Processor UDIMM Memory Support									
Ranks Per DIMM & Data Width	Memory Capacity Per DIMM (See the Note below)			Speed (MT/s) and Voltage Validated by Slot per Channel (SPC) and DIMM Per Channel (DPC)					
				1 Slot Per Channel		2 Slots Per Channel			
				1DPC		1DPC		2DPC	
				1.35V	1.5V	1.35V	1.5V	1.35V	1.5V
SRx8 Non-ECC	1GB	2GB	4GB	NA	1066, 1333, 1600	NA	1066, 1333	NA	1066, 1333
DRx8 Non-ECC	2GB	4GB	8GB	NA	1066, 1333, 1600	NA	1066, 1333	NA	1066, 1333
SRx16 Non-ECC	512MB	1GB	2GB	NA	1066, 1333, 1600	NA	1066, 1333	NA	1066, 1333
SRx8 ECC	1GB	2GB	4GB	1066, 1333	1066, 1333, 1600	1066, 1333	1066, 1333	1066	1066, 1333
DRx8 ECC	2GB	4GB	8GB	1066, 1333	1066, 1333, 1600	1066, 1333	1066, 1333	1066	1066, 1333

Intel E5-2600 Series Processor RDIMM Memory Support									
Ranks Per DIMM & Data Width	Memory Capacity Per DIMM (See the Note Below)			Speed (MT/s) and Voltage Validated by Slot per Channel (SPC) and DIMM Per Channel (DPC)					
				1 Slot Per Channel		2 Slots Per Channel			
				1DPC		1DPC		2DPC	
				1.35V	1.5V	1.35V	1.5V	1.35V	1.5V
SRx8	1GB	2GB	4GB	1066, 1333	1066, 1333, 1600	1066, 1333	1066, 1333, 1600	1066, 1333	1066, 1333, 1600
DRx8	2GB	4GB	8GB	1066, 1333	1066, 1333, 1600	1066, 1333	1066, 1333, 1600	1066, 1333	1066, 1333, 1600
SRx4	2GB	4GB	8GB	1066, 1333	1066, 1333, 1600	1066, 1333	1066, 1333, 1600	1066, 1333	1066, 1333, 1600
DRx4	4GB	8GB	16GB	1066, 1333	1066, 1333, 1600	1066, 1333	1066, 1333, 1600	1066, 1333	1066, 1333, 1600
QRx4	8GB	16GB	32GB	800	1066	800	1066	800	800
QRx8	4GB	8GB	16GB	800	1066	800	1066	800	800

Intel E5-2600 Series Processor LRDIMM Memory Support						
Ranks Per DIMM & Data Width (See the Note Below)	Memory Capacity Per DIMM		Speed (MT/s) and Voltage Validated by Slot per Channel (SPC) and DIMM Per Channel (DPC)			
			1 Slot Per Channel		2 Slots Per Channel	
			1DPC		1DPC and 2DPC	
			1.35V	1.5V	1.35V	1.5V
QRx4 (DDP)	16GB	32GB	1066, 1333	1066, 1333	1066	1066, 1333
QRx8 (P)	8GB	16GB	1066, 1333	1066, 1333	1066	1066, 1333

Notes

For the memory to work properly, please install DIMMs of the same type, speed and frequency. Mixing RDIMMs, UDIMMs or LRDIMMs is not allowed. Do not install both ECC and non-ECC memory modules on the same motherboard.

Using DDR3 DIMMs with different frequencies is not allowed.

5-6 Adding Add-on Cards

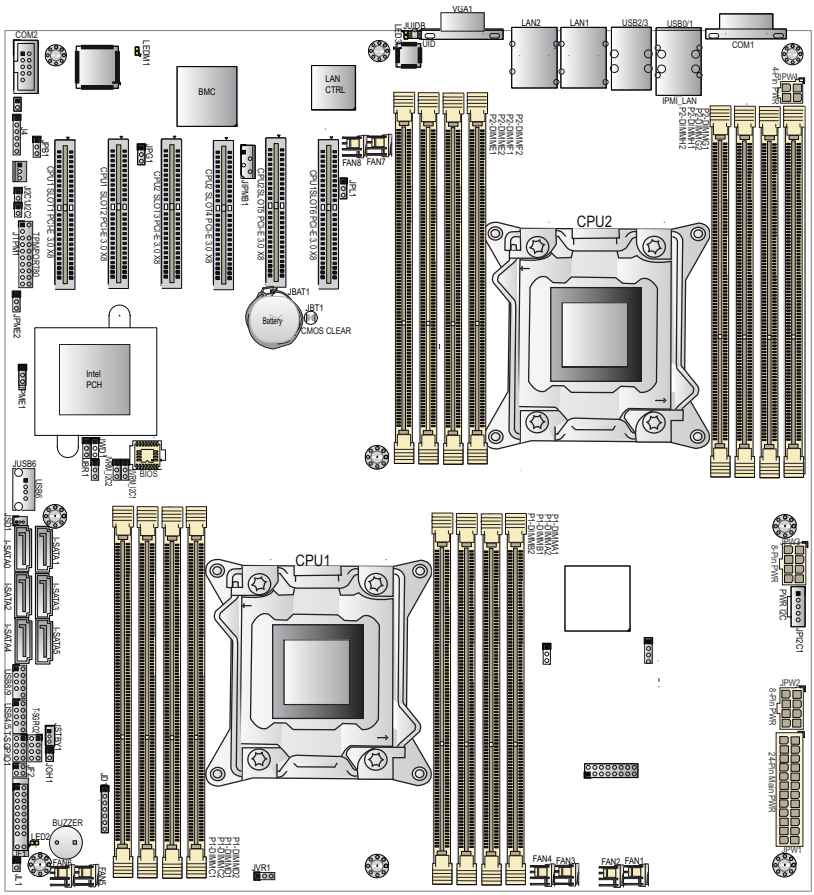
One riser card is used to support eight internal SAS connections size expansion (add-on) card to the system.

Add-on Card Installation

Begin by releasing the locking tab that corresponds to the slot you wish to populate. Insert the add-on card into the PCI-E slot by pushing down with your thumbs evenly on both sides of the card.

5-7 Serverboard Details

Figure 5-5. SUPER X9DRD-EF Layout



X9DRD-EF Quick Reference

LED	Description	State	Status
LED2	Standby PWR LED	Green: On	Standby PWR On
LED3	Rear UID LED	Blue: On	Unit Identified
LEDM1	BMC Heartbeat LED	Green: Blinking	BMC Normal

Jumper	Description	Default Setting
JBT1	Clear CMOS	See Section 5-9
JI²C1/JI²C2	SMB to PCI-E Slots	Open (Disabled)
JPB1	BMC Enable/Disable	Pins 1-2 (Enabled)
JPG1	VGA Enable/Disable	Pins 1-2 (Enabled)
JPL1	GLAN1/GLAN2 Enable/Disable	Pins 1-2 (Enabled)
JWD1	Watch Dog Timer Enable/Disable	Pins 1-2 (Reset)

X9DRD-EF Connectors

Connectors	Description
COM1/COM2	Backplane COM Port1/Front Accessible COM2 Header
FAN1~8	CPU/System Fan Headers
JD1	Speaker/Power LED Indicator
JF1	Front Panel Control Header
JIPMB1	4-pin External BMC I²C Header (for an IPMI Card)
JL1	Chassis Intrusion
JOH1	Overheat LED Indicator
JPI²C1	Power Supply SMBbus I²C Header
JPW1	24-Pin ATX Main Power Connector
JPW2/3	12V 8-Pin Power Connectors
JPW4	12V 4-Pin Power Connector
JSD1	SATA DOM (Device on Module) Power Connector
JSTBY1	+5V Standby Power Header
JTPM1	TPM (Trusted Platform Module)/Port 80
JUID	UID (Unit Identification) Switch
LAN1/LAN2	Gigabit Ethernet LAN Ports 1/2
(IPMI) LAN	Dedicated IPMI LAN Port
(I)SATA0-5	Intel SATA Ports 0-5
(CPU1) Slots 1/2/6, (CPU2)Slot3/4/5	PCI-Express 3.0 x8 Slots (See Note Below)
(T-)SGPIO 1/2	Serial ATA (SATA) General Purpose I/O Header
(BP) USB 0/1, 2/3	Back Panel USB 0/1, 2/3
(FP) USB 4/5, USB 8/9	Front Panel Accessible USB Connections (4/5, 8/9)
(FP) USB 6	Type A USB Embedded Drive Connector
VGA	Backpanel VGA Port

5-8 Connector Definitions

Power Connectors

A 24-pin main power supply connector (JPW1), two 8-pin CPU power connectors (JPW2/3) and one 4-pin power connectors (JPW5) are located on the serverboard. These power connectors meet the SSI EPS 12V specification and must be connected to your power supply to provide adequate power to the system. See the table on the right for pin definitions.

ATX Power 24-pin Connector Pin Definitions (JPW1)

Pin#	Definition	Pin #	Definition
13	+3.3V	1	+3.3V
14	-12V	2	+3.3V
15	COM	3	COM
16	PS_ON	4	+5V
17	COM	5	COM
18	COM	6	+5V
19	COM	7	COM
20	Res (NC)	8	PWR_OK
21	+5V	9	5VSB
22	+5V	10	+12V
23	+5V	11	+12V
24	COM	12	+3.3V

8-Pin Power Connectors

In addition to the ATX main power, two 8-pin 12V power connector located at JPW2 and JPW3 are also required connections. See the table on the right for pin definitions.

8-pin Power Pin Definitions (JPW2, JPW3)

Pins	Definition
1 through 4	Ground
5 through 8	+12V

NMI Button

The non-maskable interrupt button header is located on pins 19 and 20 of JF1. Refer to the table on the right for pin definitions.

NMI Button Pin Definitions (JF1)

Pin#	Definition
19	Control
20	Ground

Power LED

The Power LED connection is located on pins 15 and 16 of JF1. Refer to the table on the right for pin definitions.

Power LED Pin Definitions (JF1)

Pin#	Definition
15	3.3V
16	PWR LED

HDD LED

The HDD LED connection is located on pins 13 and 14 of JF1. Attach a cable here to indicate HDD activity. See the table on the right for pin definitions.

HDD LED Pin Definitions (JF1)

Pin#	Definition
13	3.3V Standby
14	HD Active

NIC1/NIC2 LED Indicators

The NIC (Network Interface Controller) LED connection for LAN port 1 is located on pins 11 and 12 of JF1, and the LED connection for LAN Port 2 is on pins 9 and 10. Attach the NIC LED cables here to display network activity. Refer to the table on the right for pin definitions.

NIC1/2 LED Pin Definitions (JF1)

Pin#	Definition
9	Vcc
10	NIC 2 LED
11	Vcc
12	NIC 1 LED

Overheat (OH)/Fan Fail/PWR Fail/UID LED

Connect an LED cable to pins 7 and 8 of JF1 to use the Overheat/Fan Fail/ Power Fail and UID LED connections. The red LED on pin 7 provides warnings of overheat, fan failure or power failure. The blue LED on pin 8 works as the front panel UID LED indicator. The red LED takes precedence over the blue LED by default. Refer to the tables on the right for pin definitions.

OH/Fan Fail/ PWR Fail/Blue_UID LED Pin Definitions (JF1)

Pin#	Definition
7	Red_LED-Cathode/OH/Fan Fail/ Power Fail5.5V.SB
8	Blue_UID LED

OH/Fan Fail/PWR Fail LED Status (Red LED)

State	Definition
Off	Normal
On	Overheat
Flashing	Fan Fail

Power Fail LED

The Power Fail LED connection is located on pins 5 and 6 of JF1. Refer to the table on the right for pin definitions.

PWR Fail LED Pin Definitions (JF1)

Pin#	Definition
5	3.3V
6	PWR Supply Fail

Reset Button

The Reset Button connection is located on pins 3 and 4 of JF1. Attach it to a hardware reset switch on the computer case. Refer to the table on the right for pin definitions.

Reset Button Pin Definitions (JF1)

Pin#	Definition
3	Reset
4	Ground

Power Button

The Power Button connection is located on pins 1 and 2 of JF1. Momentarily contacting both pins will power on/off the system. This button can also be configured to function as a suspend button (with a setting in the BIOS - See Chapter 7). To turn off the power when the system is in suspend mode, press the button for 4 seconds or longer. Refer to the table on the right for pin definitions.

Power Button Pin Definitions (JF1)

Pin#	Definition
1	Signal
2	Ground

Serial Ports

Two COM connections (COM1 & COM2) are located on the serverboard. COM1 is located on the rear I/O panel. COM2, located close to CPU Slot3, provides front access support. See the table on the right for pin definitions.

Serial Port Pin Definitions (COM1/COM2)

Pin #	Definition	Pin #	Definition
1	CDC	6	DSR
2	RXD	7	RTS
3	TXD	8	CTS
4	DTR	9	RI
5	Ground	10	NC

Universal Serial Bus (USB)

Four Universal Serial Bus ports (USB 0/1, USB 2/3) are located on the rear I/O panel. Additional USB headers provide four front-accessible USB connections (USB 4/5, USB 8/9). One Type A connector (USB6) also supports front panel USB connection. (Cables are not included). See the tables on the right for pin definitions.

Backplane USB (0/1, 2/3) Pin Definitions

Pin#	Definition
1	+5V
2	PO-
3	PO+
4	Ground
5	NA

FP USB (4/5, 8/9, USB 6) Pin Definitions

USB 4, 8, 6, Pin #	Definition	USB 5, 9 Pin #	Definition
1	+5V	1	+5V
2	PO-	2	PO-
3	PO+	3	PO+
4	Ground	4	Ground
5	NC	5	Key

NC = No Connection

Ethernet Ports

Two Ethernet ports (LAN1/LAN2) are located next to the VGA port on the I/O back panel. An IPMI Dedicated LAN port is also located above the USB0/1 ports. This provides a dedicated network connection for IPMI 2.0 support. These ports accept RJ45 type connectors/cables.

LAN Port Pin Definitions

Pin#	Definition		
1	GND	9	TD0+
2	Vcc19-LAN	10	TD0
3	TD3+	11	Link 100 LED
4	TD3-	12	Link 100 LED
5	TD2+-	13	3.3V
6	TD2-	14	Act LED
7	TD1+-	15	GND
8	TD1-	16	GND

Unit Identifier Switch/UID LED Indicators

A Unit Identifier (UID) switch and two LED indicators are provided on the serverboard. The UID switch is located next to the VGA port on the backplane. The rear UID LED (LED3) is located next to the UID switch. The Control Panel UID LED is located on pins 7/8 of JF1. Connect a cable to pin 8 on JF1 for the UID LED on the control panel. When you press the UID switch, both the rear front Panel UID LED indicators will turn on. Press the UID switch again to turn off both LED indicators. These UID indicators provide easy identification of a system unit that may be in need of service.

UID Switch

Pin#	Definition
1	Ground
2	Ground
3	Button In
4	Ground

UID LED (LED3) Status

Color/State	Status
Blue: On	Unit Identified

Chassis Intrusion

A Chassis Intrusion header is located at JL1 on the serverboard. Attach the appropriate cable from the chassis to inform you of a chassis intrusion when the chassis is opened.

Chassis Intrusion Pin Definitions

Pin#	Definition
1	Intrusion Input
2	Ground

Fan Headers

The Server board has eight fan headers (Fan1 ~ Fan8). These are all 4-pin fan headers, however pins 1-3 are backward compatible with traditional 3-pin fans. A fan speed control setting in the BIOS (Hardware Monitoring section) allows the BIOS to automatically set fan speeds based on the system temperature. Refer to the table on the right for pin definitions.

Note: Please use all 3-pin fans or all 4-pin fans on a serverboard. Do not mix 3-pin fans and 4-pin fans on the same board.

Fan Header Pin Definitions

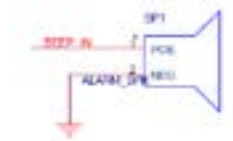
Pin#	Definition
1	Ground
2	+12V
3	Tachometer
4	PWR Modulation

Internal Speaker

The Internal Speaker, located at SP1, can be used to provide audible indications for various beep codes. See the table on the right for pin definitions. Refer to the layout below for the locations of the Internal Buzzer (SP1).

Internal Buzzer (SP1) Pin Definition

Pin#		Definitions
Pin 1	Pos. (+)	Beep In
Pin 2	Neg. (-)	Alarm Speaker



Power LED/Speaker

On JD1 header, pins 1-3 are used for power LED indication, and pins 4-7 are for the speaker. See the tables on the right for pin definitions. Please note that the speaker connector pins (4-7) are used with an external speaker. If you wish to use the onboard speaker, you should close pins 6-7 with a jumper.

PWR LED Connector Pin Definitions

Pin Setting	Definition
Pin 1	Anode (+)
Pin2	Cathode (-)
Pin3	NA

Speaker Connector Pin Settings

Pin Setting	Definition
Pins 4-7	External Speaker
Pins 6-7	Internal Speaker

Trusted Platform Module Header

The JTPM1 header is used to connect a Trusted Platform Module (TPM), available separately from a third-party vendor. A TPM is a security device that allows encryption and authentication of hard drives, disallowing access if the TPM associated with it is not installed in the system. See the table on the right for pin definitions.

TPM/Port 80 Header Pin Definitions

Pin #	Definition	Pin #	Definition
1	LCLK	2	GND
3	LFRAME#	4	<(KEY)>
5	LRESET#	6	+5V (X)
7	LAD 3	8	LAD 2
9	+3.3V	10	LAD1
11	LAD0	12	GND
13	SMB_CLK4	14	SMB_DAT4
15	+3V_DUAL	16	SERIRQ
17	GND	18	CLKRUN# (X)
19	LPCPD#	20	LDRQ# (X)

Overheat LED/Fan Fail

The JOH1 header is used to connect an LED indicator to provide warnings of chassis overheating and fan failure. This LED will blink when a fan failure occurs. Refer to the tables on right for pin definitions.

Overheat LED Pin Definitions

Pin#	Definition
1	5vDC
2	OH Active

OH/Fan Fail LED Status

State	Message
Solid	Overheat
Blinking	Fan Fail

Power SMB (I^2C) Connector

The Power System Management Bus (I^2C) connector (JPI^2C1) monitors power supply, fan and system temperatures. See the table on the right for pin definitions.

PWR SMB Pin Definitions

Pin#	Definition
1	Clock
2	Data
3	PWR Fail
4	Ground
5	+3.3V

IPMB

A System Management Bus header for IPMI 2.0 is located at JIPMB1. Connect the appropriate cable here to use the IPMB I^2C connection on your system.

IPMB Header Pin Definitions

Pin#	Definition
1	Data
2	Ground
3	Clock
4	No Connection

T-SGPIO 1/2 Headers

Two T-SGPIO (Serial-Link General Purpose Input/Output) headers are located near the SATA connectors on the serverboard. These headers are used to communicate with the enclosure management chip in the system. See the table on the right for pin definitions. Refer to the board layout below for the locations of the headers.

Serial Link SGPIO Pin Definitions

Pin#	Definition	Pin	Definition
1	NC	2	NC
3	Ground	4	DATA Out
5	Load	6	Ground
7	Clock	8	NC

NC = No Connection

DOM PWR Connector

A Disk On Module (DOM) Power Connector is located at JDS1. This connector is used to provide power to auxilliary flash memory media attached to a SATA port. See the table on the right for pin definitions.

DOM PWR Connector Pin Definitions

Pin	Definition
1	5V
2	Ground
3	Ground

Standby Power Header

The +5V Standby Power header is located at JSTBY1 on the serverboard. See the table on the right for pin definitions. (You must also have a card with a Standby Power connector and a cable to use this feature.)

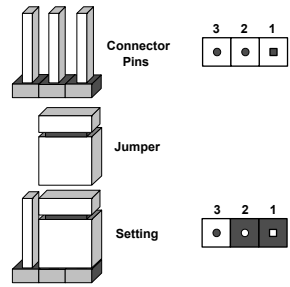
Standby PWR Pin Definitions

Pin#	Definition
1	+5V Standby
2	Ground
3	Wake-up

5-9 Jumper Settings

Explanation of Jumpers

To modify the operation of the serverboard, jumpers can be used to choose between optional settings. Jumpers create shorts between two pins to change the function of the connector. Pin 1 is identified with a square solder pad on the printed circuit board. See the diagram at right for an example of jumping pins 1 and 2. Refer to the serverboard layout page for jumper locations.



Note: On two-pin jumpers, "Closed" means the jumper is on and "Open" means the jumper is off the pins.

CMOS Clear

JBT1 is used to clear CMOS and will also clear any passwords. Instead of pins, this jumper consists of contact pads to prevent accidentally clearing the contents of CMOS.

To Clear CMOS

1. First power down the system and unplug the power cord(s).
2. With the power disconnected, short the CMOS pads with a metal object such as a small screwdriver.
3. Remove the screwdriver (or shorting device).
4. Reconnect the power cord(s) and power on the system.

Note: *Do not use the PW_ON connector to clear CMOS*.

VGA Enable/Disable

JPG1 allows you to enable or disable the VGA port. The default position is on pins 1 and 2 to enable VGA. See the table on the right for jumper settings.

VGA Enable/Disable Jumper Settings (JPG1)	
Jumper Setting	Definition
Pins 1-2	Enabled
Pins 2-3	Disabled

PCI Slot SMB Enable

Use Jumpers JI²C1/JI²C2 to enable PCI SMB (System Management Bus) support to improve system management for the PCI slots. Default is disabled. See the table on the right for jumper settings.

PCI Slot SMB Enable/Disable Jumper Settings	
Jumper Setting	Definition
Closed	Enabled
Open (Default)	Disabled

LAN Port Enable/Disable

Use JPL1 to enable or disable the LAN ports on the serverboard. See the table on the right for jumper settings. The default setting is enabled.

LAN Port En/Disable Jumper Settings	
Pin#	Definition
Pins 1-2	Enabled
Pins 2-3	Disabled

BMC Enable/Disable

JPB1 is used to enable or disable the BMC (Baseboard Management Control) chip to provide IPMI 2.0/KVM support. The default position is on pins 1 and 2 to enable BMC. See the table on the right for jumper settings.

BMC IPMI Enable/Disable Jumper Settings	
Settings	Definition
Pins 1-2	Enabled
Pins 2-3	Disabled

Watch Dog Enable

Watch Dog is a system monitor that can reboot the system when a software application hangs. Close pins 1-2 to reset the system if an application hangs. Close pins 2-3 to generate a non-maskable interrupt signal for the application that hangs. See the table on the right for jumper settings. Watch Dog must also be enabled in the BIOS.

Watch Dog Jumper Settings	
Jumper Setting	Definition
Pins 1-2	Reset (default)
Pins 2-3	NMI
Open	Disabled

5-10 Onboard Indicators

LAN1/LAN2 LEDs

Each Ethernet port has two LEDs. The yellow LED indicates activity when blinking while the other LED may be green, amber or off to indicate the speed of the connection. See the table on the right for the functions associated with the connection speed LED.

LAN LED Connection Speed Indicator	
LED State	Definition
Off	No connection or 10 Mb/s
Green	100 Mb/s
Amber	1 Gb/s

IPMI Dedicated LAN

In addition to the LAN ports, a dedicated IPMI LAN port is also included on the X9DRD-EF. The amber LED on the right indicates activity, while the green LED on the left indicates the speed of the connection. See the table at right for more information.

IPMI LAN Link LED (Left) & Activity LED (Right)		
LED	Color	Definition
Link (left)	Green: Solid	100 Mbps
Activity (right)	Amber: Blinking	Active

Onboard Standby Power LED

An Onboard Standby Power LED is located at LED2 on the serverboard. When LED2 is on, the system is running. Make sure to disconnect the power cable before removing or installing any components.

Onboard PWR LED Indicator LED States	
LED Color	Definition
Off	System Off (PWR cable not connected)
Green	System On
Green: Flashing Quickly	ACPI S1 State

BMC Heartbeat LED

A BMC Heartbeat LED is located at LEDM1 on the serverboard. When LEDM1 is blinking, the BMC is functioning normally. See the table at right for more information.

BMC Heartbeat LED States	
Color/State	Definition
Green: Blinking	BMC: Normal

5-11 SATA Drive Ports

SATA Ports

There are four SATA 2.0 (SATA2~SATA5) and two SATA 3.0 (SATA0-1) ports located on the X9DRD-EF. ISee the table on the right for pin definitions.

SATA Port Pin Definitions (SATA0 ~ SATA5)

Pin #	Definition
1	Ground
2	TXP
3	TXN
4	Ground
5	RXN
6	RXP
7	Ground

Notes

Chapter 6

Advanced Chassis Setup

This chapter covers the steps required to install components and perform maintenance on the chassis. For component installation, follow the steps in the order given to eliminate the most common problems encountered. If some steps are unnecessary, skip ahead to the step that follows.

Tools Required: The only tool you will need to install components and perform maintenance is a Philips screwdriver.

6-1 Static-Sensitive Devices

Electrostatic discharge (ESD) can damage electronic components. To prevent damage to any printed circuit boards (PCBs), it is important to handle them very carefully. The following measures are generally sufficient to protect your equipment from ESD damage.

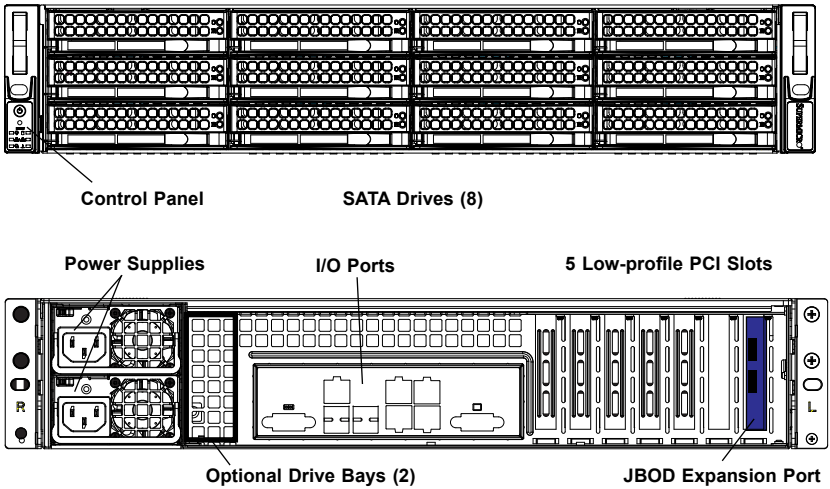
Precautions

- Use a grounded wrist strap designed to prevent static discharge.
- Touch a grounded metal object before removing any board from its antistatic bag.
- Handle a board by its edges only; do not touch its components, peripheral chips, memory modules or gold contacts.
- When handling chips or modules, avoid touching their pins.
- Put the serverboard, add-on cards and peripherals back into their antistatic bags when not in use.
- For grounding purposes, make sure your computer chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the serverboard.

Unpacking

The serverboard is shipped in antistatic packaging to avoid static damage. When unpacking the board, make sure the person handling it is static protected.

Figure 6-1. Front and Rear Chassis Views



6-2 Control Panel

The control panel (located on the front of the chassis) must be connected to the JF1 connector on the serverboard to provide you with system status indications. A ribbon cable has bundled these wires together to simplify the connection. Connect the cable from JF1 on the serverboard to the Control Panel PCB (printed circuit board). Make sure the red wire plugs into pin 1 on both connectors. Pull all excess cabling out of the airflow path. The LEDs inform you of system status.

See Chapter 3 for details on the LEDs and the control panel buttons. Details on JF1 can be found in Chapter 5.

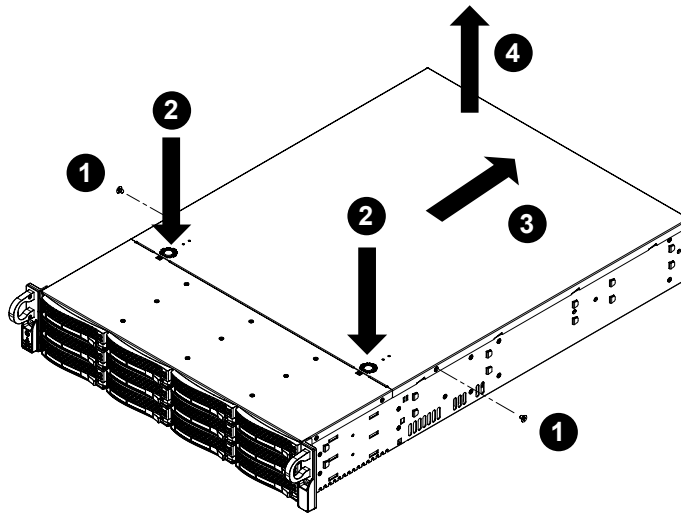
6-3 Accessing the Inside of the Chassis

Some maintenance will require accessing the inside of the server.

Removing the Chassis Cover (Figure 6-2)

1. Remove the two screws from the sides of the chassis cover.
2. Press both release tabs at the same time to unlock the cover.
3. Slide the cover toward the rear of the chassis.
4. Lift the cover off the chassis.

Figure 6-2. Removing the Chassis Cover



6-4 System Fans

Three 8-cm hot-swap fans provide the cooling for the system. It is very important that the chassis top cover is properly installed and making a good seal in order for the cooling air to circulate properly through the chassis and cool the components.

System Fan Failure

Fan speed is controlled by system temperature via a BIOS setting. If a fan fails, the remaining fans will ramp up to full speed and the overheat/fan fail LED on the control panel will turn on. Replace any failed fan at your earliest convenience with the same type and model (the system can continue to run with a failed fan). Remove the top chassis cover while the system is still running to determine which of the fans has failed.

Caution: Except for short periods of time, do not operate the server without the chassis cover in place. The cover must be in place to allow proper airflow and prevent overheating.

Replacing System Fans

1. If necessary, open the chassis while the power is running to determine which fan requires changing. (Never run the server for an extended period of time with the chassis open.)

2. Turn off the power to the system and unplug the system from the outlet.

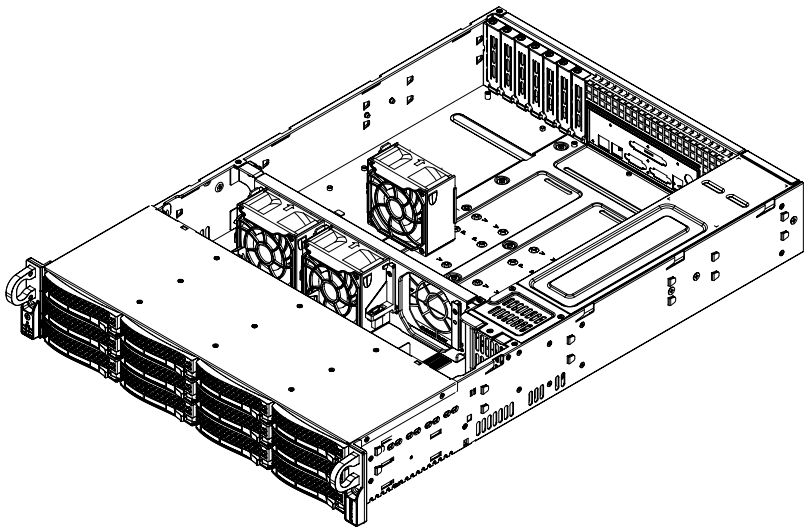
3. Remove the failed fan's power cord from the serverboard.

4. Press the fan release tab to lift the failed fan from the chassis and pull it completely from the chassis.

5. Place the new fan into the vacant space in the housing, while making sure the arrows on the top of the fan (indicating air direction) point in the same direction as the arrows on the other fans.

6. Power up the system and check that the fan is working properly before replacing the chassis cover.

Figure 6-3. Replacing System Cooling Fans



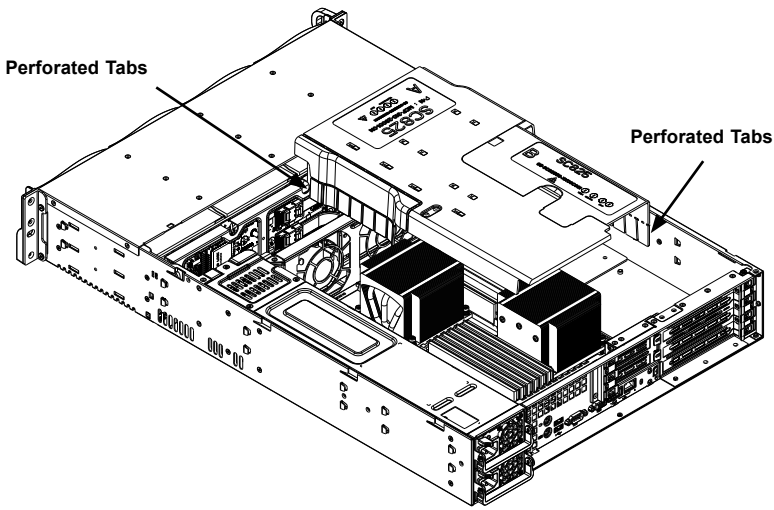
6-5 Air Shroud

Air shrouds concentrate airflow to maximize fan efficiency. The chassis air shroud does not require screws to set up.

Installing the Air Shroud

1. Lay the chassis on a flat, stable surface and remove the chassis cover.
2. If necessary, move any cables that interfere with the air shroud placement.
3. Place the air shroud in the chassis. The air shroud fits just behind the two fans closest to the power supply. Slide the air shroud into the grooves just behind the fan rack.
4. If necessary, the perforated tabs on either side of the air shroud may be removed to ensure a proper fit.

Figure 6-4. Replacing the Air Shroud



6-6 Drive Bay Installation/Removal

Accessing the Drive Bays

You do not need to access the inside of the chassis or remove power to replace or swap SATA drives. Proceed to the next step for instructions.

SATA Drive Installation

These drives are mounted in carriers to simplify their installation and removal from the chassis. The carriers also help promote proper airflow for the drives. For this reason, even empty carriers without hard drives installed must remain in the chassis.

Removing a Drive Carrier

1. Push the release button located beside the drive's LEDs.

2. Swing the handle fully out and use it to pull the drive carrier straight out (see Figure 6-5).

Mounting a Drive in a Drive Carrier

1. To add a new SATA drive, install the drive into the carrier with the printed circuit board side facing down so that the mounting holes align with those in the carrier.

2. Secure the drive to the carrier with four screws, as shown in Figure 6-5.

Note: Your operating system must have RAID support to enable the hot-plug capability of the drives.

Figure 6-5. Removing a Hard Drive Carrier

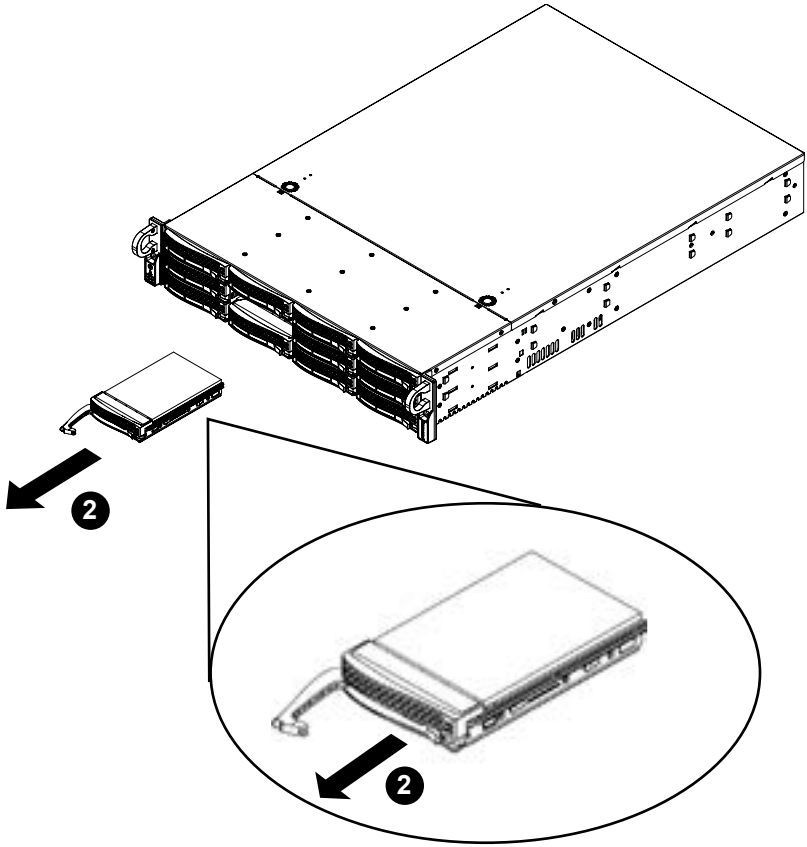
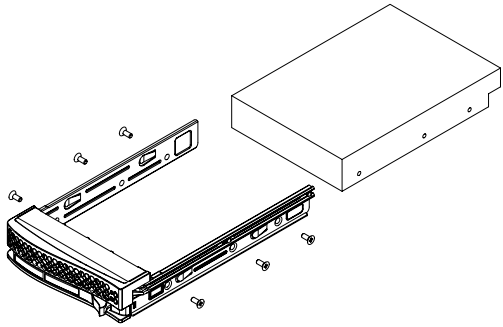


Figure 6-6. Mounting a Drive in a Carrier



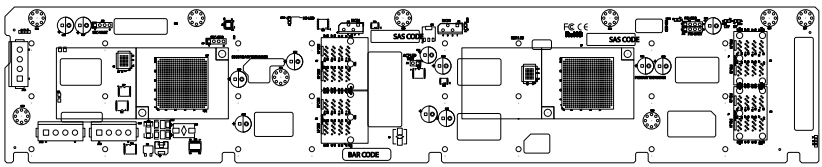
Caution: Use care when working around the backplane. Do not touch the backplane with any metal objects and make sure no ribbon cables touch the backplane or obstruct the holes, which aid in proper airflow.

Caution: Regardless of how many hard drives are installed, all drive carriers must remain in the drive bays to maintain proper airflow.

Hard Drive Backplane

The hard drives plug into a backplane that provides power, drive ID and bus termination. A RAID controller can be used with the backplane to provide data security. The operating system you use must have RAID support to enable the hot-swap capability of the hard drives. The backplane is already preconfigured, so no jumper or switch configurations are required.

Figure 6-7. Backplane



6-7 Power Supply

The ESA-A10 has a 920 watt redundant power supply consisting of two power modules. Each power supply module has an auto-switching capability, which enables it to automatically sense and operate at a 100V - 240V input voltage.

Power Supply Failure

An amber light will be illuminated on the power supply when the power is off. An illuminated green light indicates that the power supply is operating. If either of the two power supply modules fail, the other module will take the full load and allow the system to continue operation without interruption. The Power Fail LED on the front control panel will illuminate and remain on until the failed unit has been replaced.

The power supply units have a hot-swap capability, meaning you can replace the failed unit without powering down the system.

Removing/Replacing the Power Supply

You do not need to shut down the system to replace a power supply unit. The backup power supply module will keep the system up and running while you replace the failed hot-swap unit. Replace with the same model (see part number in the Appendix).

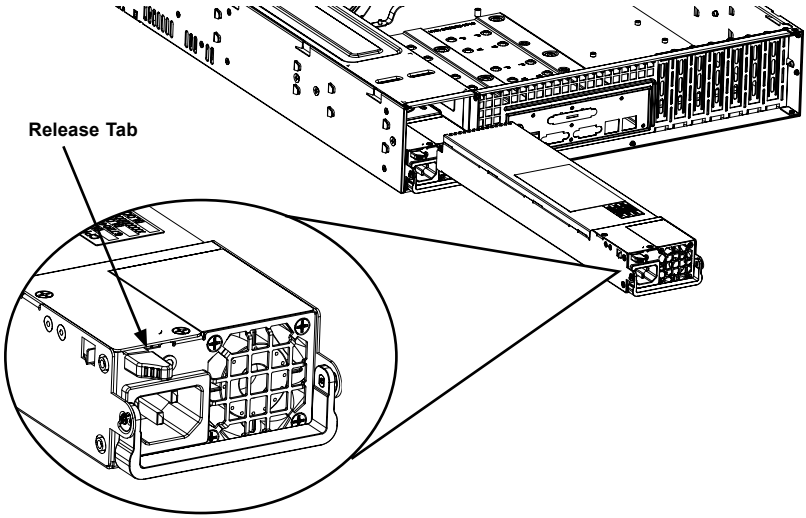
Removing the Power Supply (Figure 6-8)

1. First unplug the AC power cord from the failed power supply module.
2. Depress the locking tab on the power supply module.
3. Use the handle to pull it straight out with the rounded handle.

Installing a New Power Supply

1. Replace the failed hot-swap unit with another identical power supply unit.
2. Push the new power supply unit into the power bay until you hear a click.
3. Secure the locking tab on the unit.
4. Finish by plugging the AC power cord back into the unit.

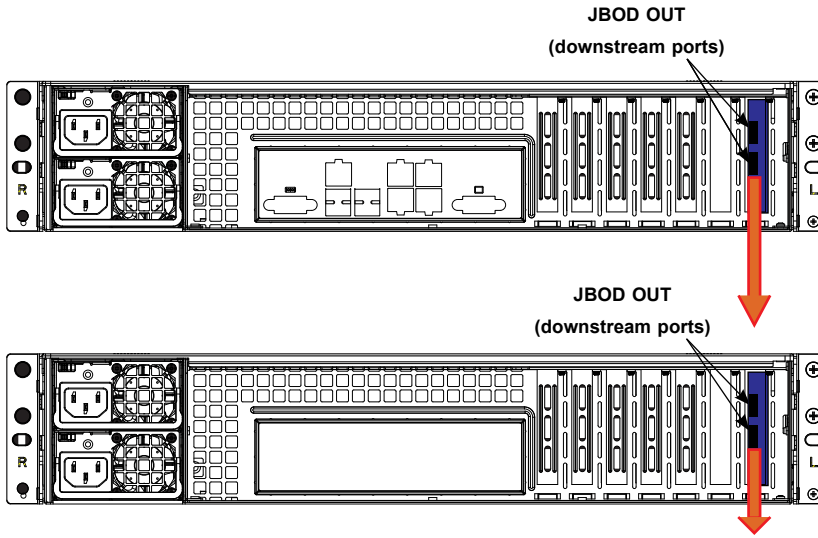
Figure 6-8. Removing the Power Supply



6-8 Attaching a JBOD Expansion Chassis

The ESA-A10 features a single JBOD expansion port. The JBOD attachment will vary depending on the specific JBOD chassis that is being connected. The JBOD image below is provided for illustrative purposes only; port location and routing specifications are subject to change. Please follow the instructions provided with the JBOD.

Figure 6-9. JBOD Expansion Port



Notes

Chapter 7

BIOS

7-1 Introduction

This chapter describes the AMI BIOS Setup utility for the serverboard. It also provides the instructions on how to navigate the AMI BIOS Setup utility screens. The AMI ROM BIOS is stored in a Flash EEPROM and can be easily updated.

Starting BIOS Setup Utility

To enter the AMI BIOS Setup utility screens, press the <Del> key while the system is booting up.

> **Note**: In most cases, the <Del> key is used to invoke the AMI BIOS setup screen. There are a few cases when other keys are used, such as <F3>, <F4>, etc.

Each main BIOS menu option is described in this manual. The Main BIOS setup menu screen has two main frames. The left frame displays all the options that can be configured. Grayed-out options cannot be configured. Options in blue can be configured by the user. The right frame displays the key legend. Above the key legend is an area reserved for informational text. When an option is selected in the left frame, it is highlighted in white. Often informational text will accompany it.

> **Note**: The AMI BIOS has default informational messages built in. The manufacturer retains the option to include, omit, or change any of these informational messages.

The AMI BIOS Setup utility uses a key-based navigation system called "hot keys." Most of the AMI BIOS setup utility "hot keys" can be used at any time during setup navigation. These keys include <F3>, <F4>, <Enter>, <ESC>, arrow keys, etc.

> **Note 1**: Options printed in **Bold** are default settings.
>
> **Note 2**: <F3> is used to load optimal default settings. <F4> is used to save the settings and exit the setup utility.

How To Change the Configuration Data

The configuration data that determines the system parameters may be changed by entering the AMI BIOS Setup utility. This Setup utility can be accessed by pressing <Delete> at the appropriate time during system boot.

Note: For AMI UEFI BIOS Recovery, please refer to the UEFI BIOS Recovery User Guide posted @http://www.docs.cloudbyte.com.

Starting the Setup Utility

Normally, the only visible Power-On Self-Test (POST) routine is the memory test. As the memory is being tested, press the <Delete> key to enter the main menu of the AMI BIOS Setup utility. From the main menu, you can access the other setup screens. An AMI BIOS identification string is displayed at the left bottom corner of the screen below the copyright message.

Warning! Do not upgrade the BIOS unless your system has a BIOS-related issue. Flashing the wrong BIOS can cause irreparable damage to the system. In no event shall the manufacturer be liable for direct, indirect, special, incidental, or consequential damage arising from a BIOS update. If you have to update the BIOS, do not shut down or reset the system while the BIOS is being updated to avoid possible boot failure.

7-2 Main Setup

When you first enter the AMI BIOS Setup utility, you will enter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab on the top of the screen. The Main BIOS Setup screen is shown below.

The AMI BIOS Main menu displays the following information:

System Date/System Time

Use this option to change the system time and date. Highlight *System Time* or *System Date* using the arrow keys. Enter new values through the keyboard and press <Enter>. Press the <Tab> key to move between fields. The date must be entered in Day MM/DD/YY format. The time is entered in HH:MM:SS format. (**Note:** The time is in the 24-hour format. For example, 5:30 P.M. appears as 17:30:00.).

board

Version

This item displays the SMC version of the BIOS ROM used in this system.

Build Date

This item displays the date that the BIOS Setup utility was built.

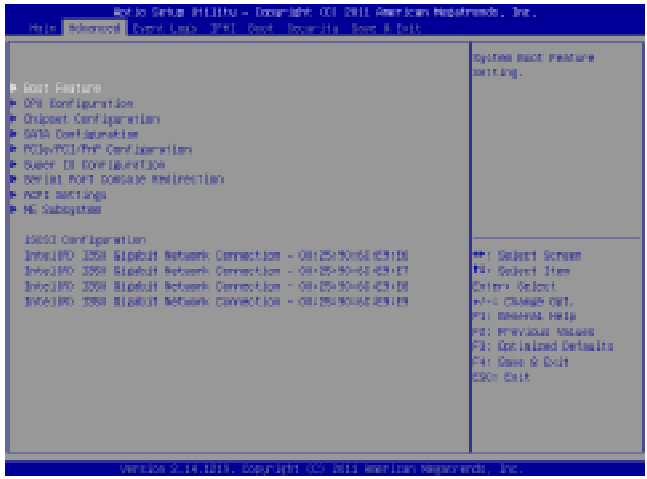
Memory Information

Total Memory

This displays the amount of memory that is available in the system.

7-3 Advanced Setup Configurations

Select the Advanced tab to access the following submenu items.



▶Boot Feature

Quiet Boot

This feature allows the user to select bootup screen display between POST messages and the OEM logo. Select Disabled to display the POST messages. Select Enabled to display the OEM logo instead of the normal POST messages. The options are **Enabled** and Disabled.

AddOn ROM Display Mode

Use this item to set the display mode for the Option ROM. Select Keep Current to use the current AddOn ROM Display setting. Select Force BIOS to use the Option ROM display mode set by the system BIOS. The options are Keep Current and **Force BIOS**.

Bootup Num-Lock

Use this feature to set the Power-on state for the Numlock key. The options are Off and **On**.

Wait For 'F1' If Error

Select Enabled to force the system to wait until the 'F1' key is pressed if an error occurs. The options are Disabled and **Enabled**.

Interrupt 19 Capture

Interrupt 19 is the software interrupt that handles the boot disk function. When this item is set to Enabled, the ROM BIOS of the host adaptors will "capture" Interrupt 19

at bootup and allow the drives that are attached to these host adaptors to function as bootable disks. If this item is set to Disabled, the ROM BIOS of the host adaptors will not capture Interrupt 19, and the drives attached to these adaptors will not function as bootable devices. The options are **Enabled** and Disabled.

Power Configuration

Watch Dog Function

If enabled, the Watch Dog timer will allow the system to automatically reboot when a non-recoverable error occurs that lasts for more than five minutes. The options are Enabled and **Disabled.**

Power Button Function

If this feature is set to Instant Off, the system will power off immediately as soon as the user presses the power button. If this feature is set to 4 Seconds Override, the system will power off when the user presses the power button for 4 seconds or longer. The options are **Instant Off** and 4 Seconds Override.

Restore on AC Power Loss

Use this feature to set the power state after a power outage. Select Stay Off for the system power to remain off after a power loss. Select Power On for the system power to be turned on after a power loss. Select Last State to allow the system to resume its last state before a power loss. The options are Stay Off, Power On, and **Last State**.

▶CPU Configuration

This submenu displays the information of the CPU as detected by the BIOS. It also allows the user to configure CPU settings.

▶Socket 1 CPU Information/Socket 2 CPU Information

This submenu displays the following information regarding the CPUs installed in Socket 1/ Socket 2.

- Type of CPU
- CPU Signature
- Microcode Patch
- CPU Stepping
- Maximum / Minimum CPU Speed

- Processor Cores
- Intel HT (Hyper-Threading) Technology
- Intel VT-x Technology
- Intel SMX Technology
- L1 Data Cache / L1 Code Cache
- L2 Cache
- L3 Cache

CPU Speed

This item displays the speed of the CPU installed in Socket 1/Socket 2.

64-bit

This item indicates if the CPU installed in Socket 1 or Socket 2 supports 64-bit technology.

Clock Spread Spectrum

Select Enable to enable Clock Spectrum support, which will allow the BIOS to monitor and attempt to reduce the level of Electromagnetic Interference caused by the components whenever needed. The options are **Disabled** and Enabled.

RTID (Record Types IDs)

This feature displays the total number of Record Type IDs for local and remote pools. The options are **Optimal** and Alternate.

Hyper-threading

Select Enabled to support Intel Hyper-threading Technology to enhance CPU performance. The options are **Enabled** and Disabled.

Active Processor Cores

Set to Enabled to use a processor's second core and above. (Please refer to Intel's website for more information.) The options are **All,** 1, 2, 4, and 6.

Limit CPUID Maximum

This feature allows the user to set the maximum CPU ID value. Enable this function to boot the legacy operating systems that cannot support processors with extended CPUID functions. The options are Enabled and **Disabled** (for the Windows OS).

Execute-Disable Bit (Available if supported by the OS & the CPU)

Select Enabled to enable the Execute Disable Bit which will allow the processor to designate areas in the system memory where an application code can execute and where it cannot, thus preventing a worm or a virus from flooding illegal codes to overwhelm the processor or damage the system during an attack. The default is **Enabled**. (Refer to Intel and Microsoft Web sites for more information.)

Intel® AES-NI

Select Enable to use the Intel Advanced Encryption Standard (AES) New Instructions (NI) to ensure data security. The options are **Enabled** and Disabled.

MLC Streamer Prefetcher (Available when supported by the CPU)

If set to Enabled, the MLC (mid-level cache) streamer prefetcher will prefetch streams of data and instructions from the main memory to the L2 cache to improve CPU performance. The options are Disabled and **Enabled**.

MLC Spatial Prefetch (Available when supported by the CPU)

If this feature is set to Disabled, The CPU prefetches the cache line for 64 bytes. If this feature is set to Enabled the CPU fetches both cache lines for 128 bytes as comprised. The options are Disabled and **Enabled**.

DCU Streamer Prefetcher (Available when supported by the CPU)

Select Enabled to support Data Cache Unit (DCU) prefetch of L1 data to speed up data accessing and processing in the DCU to enhance CPU performance. The options are Disabled and **Enabled**.

DCU IP Prefetcher

Select Enabled for DCU (Data Cache Unit) IP Prefetcher support, which will prefetch IP addresses to improve network connectivity and system performance. The options are **Enabled** and Disabled.

Intel® Virtualization Technology (Available when supported by the CPU)

Select Enabled to support Intel Virtualization Technology, which will allow one platform to run multiple operating systems and applications in independent partitions, creating multiple "virtual" systems in one physical computer. The options are **Enabled** and Disabled.

> **Note**: If there is any change to this setting, you will need to power off and restart the system for the change to take effect. Please refer to Intel's website for detailed information.)

▶ CPU Power Management Configuration

This submenu allows the user to configure the following CPU Power Management settings.

Power Technology

Select Energy Efficiency to support power-saving mode. Select Custom to customize system power settings. Select Disabled to disable power-saving settings. The options are Disabled, **Energy Efficient**, and Custom. If the option is set to Custom, the following items will display:

EIST (Available when Power Technology is set to Custom)

EIST (Enhanced Intel SpeedStep Technology) allows the system to automatically adjust processor voltage and core frequency to reduce power consumption and heat dissipation. The options are Disabled (GV3 Disabled), and **Enabled (GV3 Enabled)**. (**Note**: GV3 is Intel Speedstep support used on older platforms. Please refer to Intel's website for detailed information.)

Turbo Mode (Available when Power Technology is set to Custom and EIST is set to Enabled)

Select Enabled to use the Turbo Mode to boost system performance. The options are **Enabled** and Disabled.

C1E Support (Available when Power Technology is set to Custom)

Select Enabled to enable Enhanced C1 Power State to boost system performance. The options are **Enabled** and Disabled.

CPU C3 Report (Available when Power Technology is set to Custom)

Select Enabled to allow the BIOS to report the CPU C3 State (ACPI C2) to the operating system. During the CPU C3 State, the CPU clock generator is turned off. The options are Enabled and **Disabled.**

CPU C6 Report (Available when Power Technology is set to Custom)

Select Enabled to allow the BIOS to report the CPU C6 State (ACPI C3) to the operating system. During the CPU C6 State, the power to all cache is turned off. The options are **Enabled** and Disabled.

CPU C7 Report (Available when Power Technology is set to Custom)

Select Enabled to allow the BIOS to report the CPU C7 State (ACPI C3) to the operating system. CPU C7 State is a processor-specific low C-State. The options are **Enabled** and Disabled.

Package C-State limit (Available when Power Technology is set to Custom)

This feature allows the user to set the limit on the C-State package register. The options are C0, C2, **C6,** and No Limit.

Energy/Performance Bias

Use this feature to select an appropriate fan setting to achieve maximum system performance (with maximum cooling) or maximum energy efficiency with maximum power saving). The fan speeds are controlled by the firmware management via IPMI 2.0. The options are Performance, **Balanced Performance**, Balanced Energy, and Energy Efficient.

Factory Long Duration Power Limit

This item displays the power limit (in watts) set by the manufacturer during which long duration power is maintained.

Long Duration Power Limit

This item displays the power limit (in watts) set by the user during which long duration power is maintained. The default setting is 0.

Factory Long Duration Maintained

This item displays the period of time (in seconds) set by the manufacturer during which long duration power is maintained.

Long Duration Maintained

This item displays the period of time (in seconds) during which long duration power is maintained. The default setting is 0.

Recommended Short Duration Power

This item displays the short duration power settings (in watts) recommended by the manufacturer.

Short Duration Power Limit

During Turbo Mode, the system may exceed the processors default power setting and exceed the Short Duration Power limit. By increasing this value, the processor can provide better performance for short duration. This item displays the time period during which short duration power is maintained. The default setting is 0.

▶Chipset Configuration

▶North Bridge

This feature allows the user to configure the settings for the Intel North Bridge.

▶Integrated IO Configuration

Intel® VT-d

Select Enabled to enable Intel Virtualization Technology support for Direct I/O VT-d by reporting the I/O device assignments to the VMM (Virtual Machine Monitor) through the DMAR ACPI Tables. This feature offers fully-protected I/O resource sharing across Intel platforms, providing greater reliability, security and availability in networking and data-sharing. The options are **Enabled** and Disabled.

Intel® I/OAT

Select Enabled to enable Intel I/OAT (I/O Acceleration Technology), which significantly reduces CPU overhead by leveraging CPU architectural improvements and freeing the system resource for other tasks. The options are Disabled and **Enabled**.

DCA Support

When set to Enabled, this feature uses Intel's DCA (Direct Cache Access) Technology to improve data transfer efficiency. The options are **Enabled** and Disabled.

IIO 1 PCIe Port Bifurcation Control

This submenu configures the following IO PCIe Port Bifurcation Control settings for IIO 1 PCIe ports to determine how the available PCI-Express lanes to be distributed between the PCI-Exp. Root Ports.

CPU1 Slot1 PCI-E 3.0 x8 Link Speed/ CPU1 Slot2 PCI-E 3.0 x8 Link Speed/ CPU1 Slot6 PCI-E 3.0 x8 Link Speed

Select GEN1 for the device installed on the slot specified to support PCI-Exp Generation 1. Select GEN2 for the device installed on the slot specified to support PCI-Exp Generation 2. Select GEN3 for the device installed on the slot specified to support PCI-Exp Generation 3. The options are GEN1, GEN2, and **GEN3**.

IIO 2 PCIe Port Bifurcation Control

This submenu configures the following IO PCIe Port Bifurcation Control settings for IIO 2 PCIe ports to determine how the available PCI-Express lanes to be distributed between the PCI-Exp. Root ports.

CPU2 Slot3 PCI-E 3.0 x8 Link Speed/CPU2 Slot4 PCI-E 3.0 x8 Link Speed/CPU2 Slot5 PCI-E 3.0 x8 Link Speed

Select GEN1 for the device installed on the slot specified to support PCI-Exp Generation 1. Select GEN2 for the device installed on the slot specified to support PCI-Exp Generation 2. Select GEN3 for the device installed on the slot specified to support PCI-Exp Generation 3. The options are GEN1, GEN2**,** and **GEN3**.

▶QPI Configuration

Current QPI Link

This item displays the current status of the QPI Link.

Current QPI Frequency

This item displays the frequency of the QPI Link.

Isoc

Select Enabled to enable Isochronous support to meet QoS (Quality of Service) requirements. This feature is especially important for virtualization technology. The options are Enabled and **Disabled**.

QPI (Quick Path Interconnect) Link Speed Mode

Use this feature to select data transfer speed for QPI Link connections. The options are Slow and **Fast**.

QPI Link Frequency Select

Use this feature to select the desired QPI frequency. The options are **Auto**, 6.4 GT/s, 7.2 GT/s, and 8.0 GT/s.

▶DIMM Configuration

This section displays the following DIMM information.

Current Memory Mode

This item displays the current memory mode.

Current Memory Speed

This item displays the current memory speed.

Mirroring (Available when supported by the motherboard)

Memory mirroring creates a duplicate copy of the data stored in the memory to enhance data security.

Sparing (Available when supported by the motherboard)

Memory sparing enhances system reliability, availability, and serviceability.

▶DIMM Information

CPU Socket 1 DIMM Information, CPU Socket 2 DIMM Information

The status of the memory modules detected by the BIOS will be displayed as detected by the BIOS.

Memory Mode

When Independent is selected, all DIMMs are available to the operating system. When Mirroring is selected, the motherboard maintains two identical copies of all data in memory for data backup. When Lock Step is selected, the motherboard uses two areas of memory to run the same set of operations in parallel. The options are **Independent**, Mirroring, and Lock Step.

DRAM RAPL Mode

RAPL (Running Average Power Limit) provides mechanisms to enforce power consumption limits on supported processors The options are Disabled, DRAM RAPL MODE0, and **DRAM RAPL MODE1**.

DDR Speed

Use this feature to force a DDR3 memory module to run at a frequency other than what is specified in the specification. The options are Force DDR3-800, Force DDR3-1066, Force DDR3-1333, Force DDR3-1600 and Force SPD, and **Auto**.

Channel Interleaving

This feature selects from the different channel interleaving methods. The options are **Auto**, 1 Way, 2 Way, 3, Way, and 4 Way.

Rank Interleaving

This feature allows the user to select a rank memory interleaving method. The options are **Auto**, 1 Way, 2 Way, 4, Way, and 8 Way.

Patrol Scrub

Patrol Scrubbing is a process that allows the CPU to correct correctable memory errors detected on a memory module and send the correction to the requestor (the original source). When this item is set to Enabled, the IO hub will read and write back one cache line every 16K cycles, if there is no delay caused by internal processing. By using this method, roughly 64 GB of memory behind the IO hub will be scrubbed every day. The options are **Enabled** and Disabled.

Demand Scrub

Demand Scrubbing is a process that allows the CPU to correct correctable memory errors found on a memory module. When the CPU or I/O issues a demand-read command, and the read data from memory turns out to be a correctable error, the error is corrected and sent to the requestor (the original source). Memory is updated as well. Select Enabled to use Demand Scrubbing for ECC memory correction. The options are Enabled and **Disabled**.

Data Scrambling

Select Enabled to enable data scrambling to ensure data security and integrity. The options are Disabled and **Enabled**.

Device Tagging

Select Enabled to support device tagging. The options are **Disabled** and Enabled.

Thermal Throttling

Throttling improves reliability and reduces power consumption in the processor via automatic voltage control during processor idle states. The options are Disabled and **CLTT** (Closed Loop Thermal Throttling).

▶South Bridge Configuration

This feature allows the user to configure the settings for the Intel PCH chip.

PCH Information

This feature displays the following PCH information.

Name: This item displays the name of the PCH chip.

Stepping: This item displays the status of the PCH stepping.

USB Devices: This item displays the USB devices detected by the BIOS.

All USB Devices

This feature enables all USB ports/devices. The options are Disabled and **Enabled**. (If set to Enabled, EHCI Controller 1 and Controller 2 will appear.)

EHCI Controller 1/EHCI Controller 2 (Available when All USB Devices is set to Enabled)

Select Enabled to enable EHCI (Enhanced Host Controller Interface) Controller 1 or Controller 2. The options are Disabled and **Enabled**.

Legacy USB Support (Available when USB Functions is not Disabled)

Select Enabled to support legacy USB devices. Select Auto to disable legacy support if USB devices are not present. Select Disabled to have USB devices available for EFI (Extensive Firmware Interface) applications only. The settings are **Enabled** Disabled, and Auto.

Port 60/64 Emulation

Select Enabled to enable I/O port 60h/64h emulation support for the legacy USB keyboard so that it can be fully supported by the operating systems that does not recognize a USB device. The options are Disabled and **Enabled**.

EHCI Hand-Off

This item is for operating systems that do not support Enhanced Host Controller Interface (EHCI) hand-off. When enabled, EHCI ownership change will be claimed by the EHCI driver. The options are **Disabled** and Enabled.

▶SATA Configuration

When this submenu is selected, the AMI BIOS automatically detects the presence of IDE or SATA devices and displays the following items.

SATA Port0~SATA Port5: The AMI BIOS displays the status of each SATA port as detected by the BIOS.

SATA Mode

Use this feature to configure SATA mode for a selected SATA port. The options are Disabled, IDE Mode, **AHCI Mode** and RAID Mode. The following are displayed depending on your selection:

IDE Mode

The following items are displayed when IDE Mode is selected:

Serial-ATA (SATA) Controller 0~1

Use this feature to activate or deactivate the SATA controller, and set the compatibility mode. The options for SATA Controller 0 are Disabled, Enhanced, and **Compatible**. The options for SATA Controller 1 are Disabled and **Enhanced**.

AHCI Mode

The following items are displayed when the AHCI Mode is selected.

Aggressive Link Power Management

When Enabled, the SATA AHCI controller manages the power usage of the SATA link. The controller will put the link in a low power mode during extended periods of I/O inactivity, and will return the link to an active state when I/O activity resumes. The options are **Enabled** and Disabled.

Port 0~5 Hot Plug

Select Enabled to enable hot-plug support for a particular port, which will allow the user to change a hardware component or device without shutting down the system. The options are **Enabled** and Disabled.

Staggered Spin Up

Select Enabled to enable Staggered Spin-up support to prevent excessive power consumption caused by multiple HDDs spinning-up simultaneously. The options are Enabled and **Disabled**.

RAID Mode

The following items are displayed when RAID Mode is selected:

Port 0~5 Hot Plug

Select Enabled to enable hot-plug support for the particular port. The options are **Enabled** and Disabled.

▶PCIe/PCI/PnP Configuration

Storage Add-on Card OpROM Policy

Use this feature to select the Option ROM to boot the system when there are multiple Option ROMs available in the system. The options are **Legacy ROM** and EFI Compatible ROM.

PCI Latency Timer

Use this feature to set the latency Timer of each PCI device installed on a PCI bus. Select 64 to set the PCI latency to 64 PCI clock cycles. The options are 32, **64**, 96, 128, 160, 192, 224 and 248.

Above 4G Decoding (Available if the system supports 64-bit PCI decoding)

Select Enabled to decode a PCI device that supports 64-bit in the space above 4G Address. The options are Enabled and **Disabled**.

PERR# Generation

Select Enabled to allow a PCI device to generate a PERR number for a PCI Bus Signal Error Event. The options are Enabled and **Disabled**.

SERR# Generation

Select Enabled to allow a PCI device to generate an SERR number for a PCI Bus Signal Error Event. The options are Enabled and **Disabled**.

Maximum Payload

Select Auto to allow the system BIOS to automatically set the maximum payload value for a PCI-E device to enhance system performance. The options are **Auto**, 128 Bytes and 256 Bytes.

Maximum Read Request

Select Auto to allow the system BIOS to automatically set the maximum Read Request size for a PCI-E device to enhance system performance. The options are **Auto**, 128 Bytes, 256 Bytes, 512 Bytes, 1024 Bytes, 2048 Bytes, and 4096 Bytes.

ASPM Support

This feature allows the user to set the Active State Power Management (ASPM) level for a PCI-E device. Select Force L0s to force all PCI-E links to operate at L0s state. Select Auto to allow the system BIOS to automatically set the ASPM level for the system. Select Disabled to disable ASPM support. The options are **Disabled**, Force L0s, and Auto.

Warning: Enabling ASPM support may cause some PCI-E devices to fail!

CPU1 Slot 1 PCI-E 3.0 x8 OPROM, CPU1 Slot 2 PCI-E 3.0 x8 OPROM, CPU2 Slot 3 PCI-E 3.0 x8 OPROM, CPU2 Slot 4 PCI-E 3.0 x8 OPROM, CPU2 Slot 5 PCI-E 3.0 x8 OPROM, CPU1 Slot 6 PCI-E 3.0 x 8 OPROM

Select Enabled to enable Option ROM support to boot the computer using a device installed on the slot specified above. The options are **Enabled** and Disabled.

Onboard LAN Option ROM Select

Select iSCSI to use the iSCSI Option ROM to boot the computer using a network device. Select PXE (Preboot Execution Environment) to use an PXE Option ROM to boot the computer using a network device. The options are **PXE** and iSCSI.

Load Onboard LAN1~LAN4 Option ROM

Select Enabled to enable the onboard LAN1 Option ROM~LAN4 Option ROM. This is to boot the computer using a network device. The default setting for LAN1 Option ROM is **Enabled**, and the default setting for LAN2~LAN4 Option ROM is **Disabled**.

VGA Priority

This feature allows the user to select the graphics adapter to be used as the primary boot device. The options are **Onboard**, and Offboard.

Network Stack

Select Enabled enable PXE (Preboot Execution Environment) or UEFI (Unified Extensible Firmware Interface) for network stack support. The options are Enabled and **Disabled**.

▶Super IO Configuration

Super IO Chip: This item displays the Super IO chip used in the motherboard.

▶Serial Port 1 Configuration

Serial Port

Select Enabled to enable serial port 1. The options are **Enabled** and Disabled.

Device Settings

This item displays the settings of Serial Port 1.

Change Settings

This option specifies the base I/O port address and the Interrupt Request address of Serial Port 1. Select Disabled to prevent the serial port from accessing any system resources. When this option is set to Disabled, the serial port becomes unavailable. The options are **Auto**, IO=3F8h; IRQ=4; IO=3F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12; IO=2F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12; IO=3E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12; IO=2E8h, and IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12.

Device Mode

Use this feature to select the desired mode for a serial port specified. The options are **Normal** and High Speed.

▶Serial Port 2 Configuration

Serial Port

Select Enabled to enable serial port 2. The options are **Enabled** and Disabled.

Device Settings

This item displays the settings of Serial Port 2.

Change Settings

This option specifies the base I/O port address and the Interrupt Request address of Serial Port 2. Select Disabled to prevent the serial port from accessing any system resources. When this option is set to Disabled, the serial port becomes unavailable. The options are **Auto**, IO=3F8h; IRQ=4; IO=3F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12; IO=2F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12; IO=3E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12; and IO=2E8h, and IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12.

Device Mode

Use this feature to select the desired mode for a serial port specified. The options are **Normal** and High Speed.

Serial Port 2 Attribute

Use this feature to select the attribute for this serial port. The options are **SOL** (Serial Over LAN), and COM.

▶Serial Port Console Redirection

COM1, COM2/SOL

These two submenus allow the user to configure the following Console Redirection settings for a COM Port specified by the user.

Console Redirection

Select Enabled to use a COM Port selected by the user for Console Redirection. The options are Enabled and Disabled. The default setting for COM1 is **Disabled**, and for COM2/SOL is **Enabled**.

▶Console Redirection Settings

This feature allows the user to specify how the host computer will exchange data with the client computer, which is the remote computer used by the user.

Terminal Type

This feature allows the user to select the target terminal emulation type for Console Redirection. Select VT100 to use the ASCII Character set. Select VT100+ to add color and function key support. Select ANSI to use the Extended ASCII Character Set. Select VT-UTF8 to use UTF8 encoding to map Unicode characters into one or more bytes. The options are VT100, **VT100+**, VT-UTF8, and ANSI.

Bits Per second

Use this feature to set the transmission speed for a serial port used in Console Redirection. Make sure that the same speed is used in the host computer and the client computer. A lower transmission speed may be required for long and busy lines. The options are 9600, 19200, 38400, 57600 and **115200** (bits per second).

Data Bits

Use this feature to set the data transmission size for Console Redirection. The options are 7 Bits and **8 Bits**.

Parity

A parity bit can be sent along with regular data bits to detect data transmission errors. Select Even if the parity bit is set to 0, and the number of 1's in data bits is even. Select Odd if the parity bit is set to 0, and the number of 1's in data bits is odd. Select None if you do not want to send a parity bit with your data bits in transmission. Select Mark to add a mark as a parity bit to be sent along with the data bits. Select Space to add a Space as a parity bit to be sent with your data bits. The options are **None**, Even, Odd, Mark and Space.

Stop Bits

A stop bit indicates the end of a serial data packet. Select 1 Stop Bit for standard serial data communication. Select 2 Stop Bits if slower devices are used. The options are **1** and 2.

Flow Control

This feature allows the user to set the flow control for Console Redirection to prevent data loss caused by buffer overflow. Send a "Stop" signal to stop sending data when the receiving buffer is full. Send a "Start" signal to start sending data when the receiving buffer is empty. The options are **None** and Hardware RTS/CTS.

VT-UTF8 Combo Key Support

Select Enabled to enable VT-UTF8 Combination Key support for ANSI/VT100 terminals. The options are **Enabled** and Disabled**.**

Recorder Mode

Select Enabled to capture the data displayed on a terminal and send it as text messages to a remote server. The options are **Disabled** and Enabled.

Resolution 100x31

Select Enabled for extended-terminal resolution support. The options are Disabled and **Enabled**.

Legacy OS Redirection Resolution

Use this feature to select the number of rows and columns used in Console Redirection for legacy OS support. The options are 80x24 and **80x25**.

Putty KeyPad

This feature selects Function Keys and KeyPad settings for Putty, which is a terminal emulator designed for the Windows OS. The options are **VT100**, LINUX, XTERMR6, SC0, ESCN, and VT400.

Redirection After BIOS POST

Use this feature to enable or disable legacy console redirection after BIOS POST. When set to Bootloader, legacy console redirection is disabled before booting the OS. When set to Always Enable, legacy console redirection remains enabled when booting the OS. The options are **Always Enable** and Bootloader.

Serial Port for Out-of-Band Management/Windows Emergency Management Services (EMS)

The submenu allows the user to configure Console Redirection settings to support Out-of-Band Serial Port management.

Console Redirection (for EMS)

Select Enabled to use a COM Port selected by the user for Console Redirection. The options are Enabled and **Disabled**.

▶Console Redirection Settings (for EMS)

This feature allows the user to specify how the host computer will exchange data with the client computer, which is the remote computer used by the user.

Out-of-Band Management Port

The feature selects a serial port used by the Microsoft Windows Emergency Management Services (EMS) to communicate with a remote server. The options are **COM1** and COM2/SOL.

Terminal Type

This feature allows the user to select the target terminal emulation type for Console Redirection. Select VT100 to use the ASCII character set. Select VT100+ to add color and function key support. Select ANSI to use the extended ASCII character set. Select VT-UTF8 to use UTF8 encoding to map Unicode characters into one or more bytes. The options are ANSI, VT100, **VT100+**, and VT-UTF8.

Bits Per Second

This item sets the transmission speed for a serial port used in Console Redirection. Make sure that the same speed is used in the host computer and the client computer. A lower transmission speed may be required for long and busy lines. The options are 9600, 19200, 57600, and **115200** (bits per second).

Flow Control

This feature allows the user to set the flow control for Console Redirection to prevent data loss caused by buffer overflow. Send a "Stop" signal to stop sending data when the receiving buffer is full. Send a "Start" signal to start sending data when the receiving buffer is empty. The options are **None,** Hardware RTS/CTS, and Software Xon/Xoff.

Data Bits, Parity, Stop Bits

The status of these features is displayed.

▶ACPI Settings

Use this feature to configure Advanced Configuration and Power Interface (ACPI) power management settings for your system.

ACPI Sleep State

Use this feature to select the ACPI State when the system is in sleep mode. Select S1 (CPU_Stop_Clock) to erase all CPU caches and stop executing instructions. Power to the CPU(s) and RAM is maintained, but RAM is refreshed. Select Suspend Disabled to use power-reduced mode. Power will only be supplied to limited components (such as RAMs) to maintain the most critical functions of the system. The options are Suspend Disabled and **S1 (CPU_Stop_Clock)**.

NUMA (NON-Uniform Memory Access)

This feature enables the Non-Uniform Memory Access ACPI support. The options are **Enabled** and Disabled.

High Precision Event Timer

Select Enabled to activate the High Precision Event Timer (HPET) that produces periodic interrupts at a much higher frequency than a Real-time Clock (RTC) does in synchronizing multimedia streams, providing smooth playback, reducing the dependency on other timestamp calculation devices, such as an x86 RDTSC Instruction embedded in the CPU. The High Performance Event Timer is used to replace the 8254 Programmable Interval Timer. The options are **Enabled** and Disabled.

▶Trusted Computing (Available when a TPM device is detected by the BIOS)

Configuration

TPM Support

Select Enabled on this item and enable the TPM jumper on the motherboard to enable TPM support to improve data integrity and network security. The options are **Enabled** and Disabled.

TPM State

Select Enabled to enable TPM security settings to improve data integrity and network security. The options are Disabled and **Enabled**.

Pending Operation

Use this item to schedule an operation for the security device. The options are **None**, Enable Take Ownership, Disable Take Ownership, and TPM Clear.

Note: During restart, the computer will reboot in order to execute the pending operation and change the state of the security device.

Current Status Information: This item displays the information regarding the current TPM status.

TPM Enable Status

This item displays the status of TPM Support to indicate if TPM is currently enabled or disabled.

TPM Active Status

This item displays the status of TPM Support to indicate if TPM is currently active or deactivated.

TPM Owner Status

This item displays the status of TPM Ownership.

▶Intel TXT (LT-SX) Configuration

Intel TXT (LT-SX) Hardware Support

This feature indicates if the following hardware components support the Intel Trusted Execution Technology.

CPU: TXT (Trusted Execution Technology) Feature

Chipset: TXT (Trusted Execution Technology) Feature

Intel TXT (LT-SX) Configuration

This feature displays the following TXT configuration setting.

TXT (LT-SX) Support: This item indicates if the Intel TXT support is enabled or disabled. The default setting is **Disabled**.

Intel TXT (LT-SX) Dependencies

This feature displays the features that need to be enabled for the Intel Trusted Execution Technology to work properly in the system.

VT-d Support: Intel Virtualization Technology with Direct I/O support

VT Support: Intel Virtualization Technology support

TPM Support: Trusted Platform support

TPM State: Trusted Platform state

▶ME Subsystem

This feature displays the following ME Subsystem Configuration settings.

- **ME BIOS Interface Version**
- **ME Version**

iSCSI Configuration: This item displays iSCSI configuration information:

iSCSI Initiator Name

This item displays the name of the iSCSI Initiator, which is a unique name used in the world. The name must use IQN format. The following actions can also be performed:

- Add an Attempt
- Delete Attempts
  - Commit/Discard Changes and Exit
- Change Attempt Order
  - Commit/Discard Changes and Exit

Intel® Ethernet Controller I350 Gigabit Network Connection: These items display the following information on the Intel I350 Gigabit network connections.

▶NIC Configuration

Link Speed

Use this feature to change the link speed and duplex for the current port. The options are **AutoNeg**, 10Mbps Half, 10Mbps Full, 100Mbps Half, and 100Mbps full.

Wake on LAN

Select enabled to wake the system with a magic packet. The options are **Enabled** and Disabled.

Blink LEDs

This feature allows the user to specify the duration for LEDs to blink. The range is from 0 - 15 seconds. The default setting is **0**.

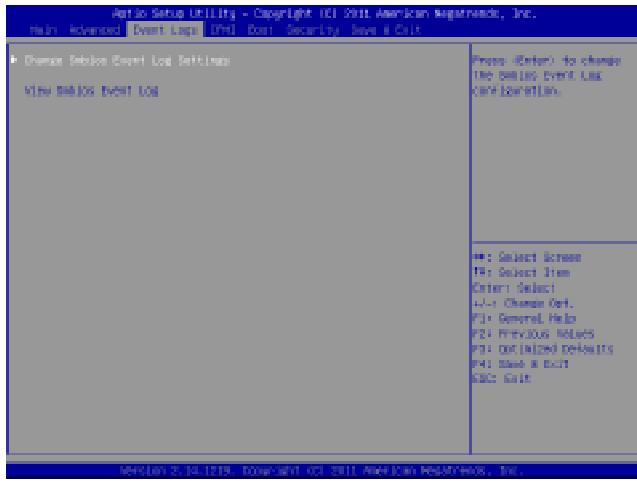
PORT CONFIGURATION INFORMATION

This section displays the following port information:

- UEFI Driver
- Adapter PBA
- Chip Type
- PCI Device ID
- PCI Bus:Device:Function
- Link Status
- Factory MAC Address / Alternate MAC Address

7-4 Event Logs

Select the Event Logs tab to access the following submenu items.



▶Change SMBIOS Event Log Settings

This feature allows the user to configure SMBIOS Event settings.

Enabling/Disabling Options

SMBIOS Event Log

Select Enabled to enable SMBIOS (System Management BIOS) Event Logging during system boot. The options are **Enabled** and Disabled.

Runtime Error Logging Support

Select Enabled to support Runtime Error Logging. The options are **Enabled** and Disabled.

Memory Correctable Error Threshold

This feature allows the user to enter the threshold value for correctable memory errors. The default setting is **10**.

PCI Error Logging Support

Select Enabled to support error event logging for PCI slots. The options are Enabled and **Disabled**.

Erasing Settings

Erase Event Log

Select Enabled to erase the SMBIOS (System Management BIOS) Event Log, which is completed before a event logging is initialized upon system reboot. The options are **No,** Yes, Next reset, and Yes, Every reset.

When Log is Full

Select Erase Immediately to immediately erase SMBIOS error event logs that exceed the limit when the SMBIOS event log is full. Select Do Nothing for the system to do nothing when the SMBIOS event log is full. The options are **Do Nothing** and Erase Immediately.

SMBIOS Event Log Standard Settings

Log System Boot Event

Select Enabled to log system boot events. The options are **Disabled** and Enabled.

MECI (Multiple Event Count Increment)

Enter the increment value for the multiple event counter. Enter a number from 1 to 255. The default setting is **1**.

METW (Multiple Event Count Time Window)

This item allows the user to decide how long (in minutes) should the multiple event counter wait before generating a new event log. Enter a number from 0 to 99. The default setting is **60**.

View SMBIOS Event Log

This item allows the user to view the event in the SMBIOS event log. Select this item and press <Enter> to view the status of an event in the log.

Date/Time/Error Code/Severity

7-5 IPMI

Select the IPMI (Intelligent Platform Management Interface) tab to access the following submenu items.

IPMI Firmware Revision

This item indicates the IPMI firmware revision used in your system.

IPMI Status

This item indicates the status of the IPMI firmware installed in your system.

▶System Event Log

Enabling/Disabling Options

SEL Components

Select Enabled for all system event logging at bootup. The options are **Enabled** and Disabled.

Erasing Settings

Erase SEL

Select Yes, On next reset to erase all system event logs upon next system reboot. Select Yes, On every reset to erase all system event logs upon each system reboot. Select No to keep all system event logs after each system reboot. The options are **No,** Yes, On next reset, and Yes, On every reset.

When SEL is Full

This feature allows the user to decide what the BIOS should do when the system event log is full. Select Erase Immediately to erase all events in the log when the system event log is full. The options are **Do Nothing** and Erase Immediately.

Custom EFI Logging Options

Log EFI Status Codes

Select Enabled to log EFI (Extensible Firmware Interface) Status Codes, Error Codes or Progress Codes. The options are **Enabled** and Disabled.

> **Note**: After making changes on a setting, be sure to reboot the system for the changes to take effect.

▶BMC Network Configuration

LAN Channel 1: This feature allows the user to configure the settings for LAN1 Port.

Update IPMI LAN Configuration

This feature allows the BIOS to implement any IP/MAC address changes at the next system boot. If the option is set to Yes, any changes made to the settings below will take effect when the system is rebooted. The options are **No** and Yes.

Configuration Address Source

This feature allows the user to select the source of the IP address for this computer. If Static is selected, you will need to know the IP address of this computer and enter it to the system manually in the field. If DHCP is selected, the BIOS will search for a DHCP (Dynamic Host Configuration Protocol) server in the network that is attached to and request the next available IP address for this computer. The options are **DHCP** and Static. The following items are assigned IP addresses automatically if DHCP is selected, or can be configured manually if Static is selected.

Station IP Address

This item displays the Station IP address for this computer. This should be in decimal and in dotted quad form (i.e., 192.168.10.253).

Subnet Mask

This item displays the sub-network that this computer belongs to. The value of each three-digit number separated by dots should not exceed 255.

Station MAC Address

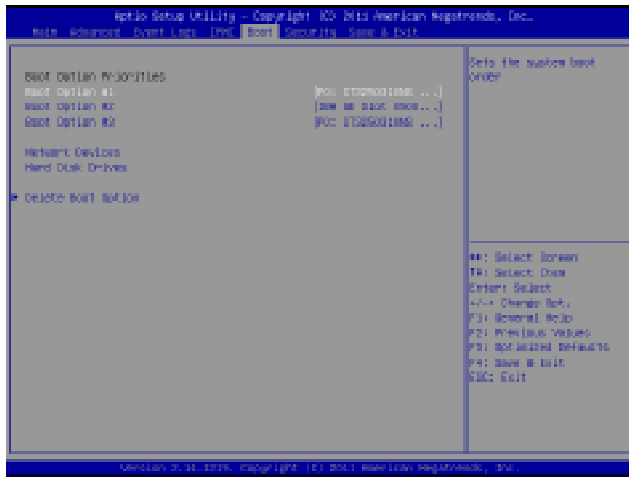
This item displays the Station MAC address for this computer. Mac addresses are 6 two-digit hexadecimal numbers.

Gateway IP Address

This item displays the Gateway IP address for this computer. This should be in decimal and in dotted quad form (i.e., 192.168.10.253).

7-6 Boot

This submenu allows the user to configure the following boot settings for the system.



Boot Option Priorities

Boot Option #1, Boot Option #2, Boot Option #3, etc.

Use this feature to specify the sequence of boot device priority.

Network Devices, Hard Disk Drives

Use these options to set the order of the legacy network and hard drive devices detected by the motherboard.

▶Delete Boot Option

This feature allows the user to select a EFI boot device to delete from the boot priority list.

Delete Boot Option

Select the desired boot device to delete.

7-7 Security

This menu allows the user to configure the following security settings for the system.

Password Check

Use this feature to determine when a password entry is required. Select Setup to require the password only when entering setup. Select Always to require the password when entering setup and on each boot. The options are **Setup** and Always.

Administrator Password

Use this feature to set the Administrator Password which is required to enter the BIOS setup utility. The length of the password should be from 3 to 20 characters long.

7-8 Save & Exit

This submenu allows the user to configure the Save and Exit settings for the system.

Discard Changes and Exit

Select this option to quit the BIOS Setup without making any permanent changes to the system configuration, and reboot the computer. Select Discard Changes and Exit, and press <Enter>. When the dialog box appears, asking you if you want to exit the BIOS setup without saving, select **Yes** to quit BIOS without saving the changes, or select No to quit the BIOS and save changes.

Save Changes and Reset

When you have completed the system configuration changes, select this option to save the changes and reboot the computer so that the new system configuration settings can take effect. Select Save Changes and Exit, and press <Enter>. When the dialog box appears, asking you if you want to exit the BIOS setup without saving, select **Yes** to quit BIOS without saving the changes, or select No to quit the BIOS and save changes.

Save Options

Save Changes

Select this option and press <Enter> to save all changes you've done so far and return to the AMI BIOS utility Program. When the dialog box appears, asking you if you want to save configuration, select **Yes** to save the changes, or select No to return to the BIOS without making changes.

Discard Changes

Select this feature and press <Enter> to discard all the changes and return to the BIOS setup. When the dialog box appears, asking you if you want to load previous values, select **Yes** to load the values previous saved, or select No to keep the changes you've made so far.

Restore Optimized Defaults

Select this feature and press <Enter> to load the optimized default settings that help optimize system performance. When the dialog box appears, asking you if you want to load optimized defaults, select **Yes** to load the optimized default settings, or select No to abandon optimized defaults.

Save as User Defaults

Select this feature and press <Enter> to save the current settings as the user's defaults. When the dialog box appears, asking you if you want to save values as user's defaults, select **Yes** to save the current values as user's default settings, or select No to keep the defaults previously saved as the user's defaults.

Restore User Defaults

Select this feature and press <Enter> to load the user's defaults previously saved in the system. When the dialog box appears, asking you if you want to restore user's defaults, select **Yes** to restore the user's defaults previously saved in the system, or select No to abandon the user's defaults that were previously saved.

Boot Override

This feature allows the user to override the Boot Option Priorities setting in the Boot menu, and instead boot the system with one of the listed devices. This is a one-time override.